ART I.—A REVIEW OF CERTAIN DOCTRINES ADVANCED BY
THE CELEBRATED LIEBIG, AND SANCTIONED BY GREGORY
AND KANE.* By Robert Hare, M. D., Professor of Chemistry
in the University of Pennsylvania.

THE means by which the various ferments respectively,
produce their appropriate changes, are involved in the
greatest obscurity. Some important additions have been
made to our knowledge, as respects the facts. The ferments
have all been shown to be vegeto-animal matter in a state
susceptible of oxidizement, and an analogy has been infer-
red between their influence and that of some other agents,
supposed to act by what has been called catalysis, which
is a new name given by Berzelius, to an old mystery. It
has long been known that there are two modes by which
chemical changes are to be excited. In one of these, the
presentation of one or two extraneous elements causes de-
composition and recomposition, by the reactions between
the elements so presented and those subjected to altera-
tion, as in the various cases of elective affinity : in the
other mode, substances are made to re-arrange their consti-
tuents into one or more new combinations, by the presence

* See "Traité," "Introduction," p. xii. See also Kane's Elements,
p. 31. Gregory's Outlines of Organic Chemistry.

of other bodies with which they do not combine, and which, in some cases, undergo no change themselves. It is to the last mentioned mode of reaction that the name above mentioned has been applied. Yet, under this head, processes have been associated which have irreconcilable features.

Thus to the following processes one rationale is given by the distinguished chemist of Giessen: *the solubility acquired by platina by being alloyed with silver—the catalyzing influence of platina sponge or platina black—the explosion of fulminating powders by slight causes—the reciprocal decomposition of bioxide of hydrogen and oxide of silver— the agency of nitric oxide in the generation of sulphuric acid—the action of ferments.*

To me it seems that there is a great diversity in the characteristics of the processes thus alluded to. In that of the alloy there is at least as many atoms of silver in actual combination with platina, as there are atoms of this metal ; and the change which the latter undergoes is precisely the same as that to which the former is subjected.

In the case of platina sponge causing the formation of water; or of platina black causing the acetification of alcoholic vapour, the inducing agent undergoes no change itself nor does it enter into chemical combination either with the materials or the products. Liebig ascribes the result in this instance, to the alternate absorption and subsequent evolution of oxygen by the powder ; since, after exposure to the gas, it may; by exhaustion, be made to give up a portion. Yet the agency of this metallic mass cannot differ, in this case, from that in which it causes the pure elements of water to combine, and in which, if absorption take place, it is not confined to oxygen more than to hydrogen. Again the fact

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* Traité de chimie organique, Paris, 1840.
  Page xix., last paragraph.
  "   xxvii., Du ferment, paragraph 2d.
  "   xxxviii. Acétification, paragraph 2d.
  "   388-9, Acid acetique.

established by Faraday, that hydrogen and oxygen may be made to unite by a well cleaned plate of platina, seems irreconcilable with the idea that *absorption* is the mean of its accomplishment. But if absorption be not the cause in the case of the plate, is it consistent to suppose it to be the cause in that of the sponge? In this, as in most other cases, Liebig seems to overlook the all-important agency of electricity in the phenomena of nature. I should infer, that the metal most probably acts by altering the electrical polarity, and consequent association of imponderable with ponderable matter.

Having inconsistently assumed that during the dehydrogenation of alcohol by atmospheric oxygen in the presence of platina black, this powder is alternately endowed with the power to take it from the air, and to impart it to that, of which the attraction for oxygen, under the circumstances, is too feeble to take it from the same source, this popular theorist proceeds to make the inference that honey, mother of vinegar, and other substances promotive of acetification, act in the same way by absorbing oxygen from the air, and abandoning it to hydrogen. But if, agreeably to the view above presented, platina black does not act by absorption, no argument, founded on the agency of that substance, will justify the idea that absorption avails in other cases; and it should be recollected that platina black is most active when most free from moisture; while honey, yeast, mother of vinegar, and other substances which cause acetification, have no attraction for oxygen in the absence of water: moreover, that the necessity for moisture to the preparatory oxidizement of gluten, caseine, diastase, and other organic substances, which, by exposure in a humid state, acquire their capacity to act as ferments, is not explained. That water acts as a catalyzer, seems to have escaped notice. Before referring to the absorption of oxygen by honey, as a ground of explanation founded on the analogy of platina sponge, should not an explanation have been given by the

ability of water in the one case to prevent, in the other to promote absorption of oxygen.

An electric spark, or any ignited body, a wire made incandescent by a galvanic discharge, has an influence analogous to platina sponge, of which the minutest particle is sufficient to cause ignition throughout an inflammable mixture, however large.   There is, in this respect, an analogy between the explosion of inflammable, gaseous mixtures, and those of gunpowder, and of other fulminating powders, of which some, as it is well known, detonate by percussion or friction, or any cause adequate to derange the equilibrium of their particles.   In the cases last mentioned, the *change* produced is the same, whatever may be the exciting cause, and the minutest portion of the congeries being made to undergo the change, is of itself competent to produce a like result as respects the whole.

Evidently the property which bioxide of hydrogen, and the oxide of silver, or bioxide of lead, have, of undergoing an explosive deoxidizement in consequence of mere superficial contact, is in some respects peculiar, since the reaction is reciprocal.   In the solution of the alloy of platina with silver, one body induces another to undergo the oxidizement to which it is itself subjected.   In the case of the bioxide of hydrogen and oxide of silver, two bodies, both prone to *de*-oxidizement, reciprocally induce that species of change.   Besides, in this phenomenon, there is no third body to perform a part analogous to that of the nitric acid.   From both of the two last mentioned instances, that of platina sponge differs, inasmuch as it undergoes no change, during its catalytic agency.

Not only have ferments power to produce *a* change, but also severally to produce *the* particular change by which either sugar, alcohol, acetic or lactic acid, &c., &c., is respectively generated.   Moreover, these bodies are themselves meanwhile undergoing an oxidation or decomposition which is necessary to their power; but the change thus

arising in them, is not like that which they induce. Hence, obviously, they operate differently either from the platina sponge or platina black, or from silver in the alloy formed by it with platina.

Liebig conceives that this increased solubility of platina by union with silver, is at war with electro-chemical principles; agreeably to which, any metal in contact with another metal, relatively electro-positive, becomes less susceptible of attack. But agreeably to the principles thus cited, this insusceptibility does not arise in one of two heterogeneous metals in chemical combination with each other, but in one of two such metals either in contact merely, or only communicating through a metallic conductor.

I am surprised that Liebig should find the mystery of catalysis lessened by the solubility of the alloy of platina with silver, when it must be evident that if the oxidation of an atom of a comparatively electro-positive metal, were a sufficient reason why an electro-negative metal, combined with it, should be oxidized, an alloy of gold with silver ought to be soluble; whereas it is known that the common process of parting, is founded on the utter insolubility of gold when so alloyed.

Liebig alleges that there can be no doubt that the acetification of alcohol is of the same order, as the reaction by which the bioxide of nitrogen provokes the formation of sulphuric acid in the leaden chamber; in which process the oxygen of the air is transferred to sulphurous acid by the intervention of that bioxide ; since, in like manner, organic substances, associated with spirit of wine, absorb oxygen, and bring it into a particular state which enables two atoms of this element, to replace two atoms of hydrogen, simultaneously oxidized and removed.

But in the case thus cited, for every equivalent of acid formed, an equivalent of the bioxide combines first with an equivalent of oxygen, (perhaps with two,) and in the next place with an equivalent of the sulphurous acid, forming a

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compound which is decomposed by water into sulphuric acid, and the regenerated bioxide. There appears to me to be no analogy between this process, and that of the influence of matter existing in no equivalent proportion, and which cannot be shown to form a definite chemical compound, either with acetyl or hydrogen.* It is not represented that in the vinous fermentation, any union, either transient or permanent, takes place between the elements of the sugar and those of the ferment; on the contrary it is alleged that the oxidation and precipitation of the yeast takes place independently, though it proceeds, *pari passu*, with the alcoholification.

As to all the processes referred to for illustration, as well as those of fermentation which they are alleged to resemble, it appears to me that Liebig and his disciples have been too sanguine of their capacity to give adequate elucidation.

Respecting changes of the kind above described as *catalytic*, Dr. Kane uses the following language :—" *The elements of a compound are retained together in certain molecular arrangement, because the affinities are there satisfied ; but it is natural to suppose that whilst the elements remain the same, their affinities for each other might be just as completely satisfied by a different molecular arrangement.*" This language might be held more reasonably, were this variation in arrangement accompanied by no concomitant acquisition of chemical properties ; but is it reasonable to consider the difference between sugar, and the alcohol and carbonic acid into which it is resolvable, as arising merely from molecular arrangement? Can

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* The reader is presumed to know that agreeably to Liebig, alcohol, $C_4 H_5 O + HO$ the hydrated protoxide of ethyl, is converted into acetic acid, the hydrated *tri*-oxide of acetyl, $C_4 H_3 O_3 + HO$, by the substitution of two atoms of oxygen for two of hydrogen. By these means it is inferred that the alcoholic base, the protoxide of ethyl, $C_4 H_5 O$ is converted into the trioxide of acetyl, $C_4 H_3 O_3$, an atom of water being present in the one no less than in the other.

the active influence of alcohol upon the animal nerves be due merely to the situations occupied by its three ultimate ponderable elements, carbon, hydrogen, oxygen, relatively to each other? Admitting that the union of oxygen with the ingredients of gluten could, by imparting any consequent mechanical impulses, cause the hydrogen and oxygen of an atom of water to unite with the elements of sugar, and to separate into alcohol and carbonic acid, as above mentioned, how can that movement, or the consequent rearrangement of the ponderable particles, explain the acquisition of new properties, of which the combining atoms, or the compounds previously containing them, were destitute? Liebig infers, that a body in the act of decomposition or combination, may communicate a movement to the atoms of an adjoining compound, so that gluten in the state of oxidation, in which it is called yeast, induces sugar, $C^{12} H^{11} O^{11}$, existing in the same liquid, to unite with the elements of water, making $C^{12} H^{12} O^{12}$, and consequently to be resolvable into four equivalents of carbonic acid and two of alcohol.

Adopting the same views as Liebig, Dr. Kane alleges, "that the slow decomposition of diastase communicates to the molecules of many thousand times its weight of starch, the degree of motion necessary for their rearrangement, and the appropriation of the elements of water requisite for the formation of starch sugar."

It is perfectly evident that the particles of the catalyzed substance are in some way so affected by the catalyzing body, as to be put into a state of reaction, which had not otherwise ensued; but that this is accomplished merely by imparted motion, appears to me to be a surmise destitute of plausibility. The fact that the weight of the diastase requisite to saccharify starch is so very small, as is alleged by Dr. Kane, evidently renders it extremely improbable that it acts by creating any mechanical disturbance. Yet this respectable chemist is so completely carried away by

this idea, that he proceeds to make the following remark :
" *This law, of which the simplest expression is that were two
chemical substances are in contact any motion occurring among
the particles of the one, may be communicated to the other, is of
a more purely mechanical nature than any other principle yet
received in chemistry, and, when more definitely established by
succeeding researches, may be the basis of a dynamic theory in
chemistry, as the law of equivalents and multiple combination
expresses the statical condition of bodies which unite by chemical
force.*"

I perfectly agree in opinion with the author of these sug-
gestions, as to the *purity of the mechanical attributes of
the principle on which they are founded,* but cannot on
this very account deem them competent to explain the
chemical phenomena on which he conceives them to bear.

As the mechanical influence of the motion of bodies is as
the weight multiplied by the velocity, is it conceivable that
any movement in the particles of one part, by weight, of
diastase, can be productive of analogous movements in
two thousand parts of starch ?

The idea that yeast might owe its power to animalcules,
suggested itself to me more than thirty years ago, and seems
to have some support from the fact, that fermentation only
thrives within the range of temperature compatible with
animal life. Latterly, its activity has been ascribed by some
observers to the agency of extremely minute vegetables.
Kane, while admitting the existence in yeast of "*a vast
number of globular bodies, possibly animalcules,*" treats
the idea as untenable, because the weight of the alcohol
and carbonic acid is greater than that of the sugar employ-
ed.   But if the union of water with the elements of the
sugar can add to the weight of the products *without* the
assistance of animalcules, wherefore should *their agency*
be inconsistent with an augmentation from the same source?
It seems to be overlooked that there has been much reason
to infer, that the conversion of cane sugar into grape sugar

(glucose) is of necessity precursory to the vinous fermentation, wherever the saccharine matter is not naturally in that state. But when grape sugar is fermented, the disparity between the weight of the sugar and its products no longer exists; the weight of the resulting alcohol and carbonic acid, are just equal to that of the sugar out of which they are generated.

Independently of any agency of this kind, which seems even more probable in the case of some species of infection than in that of fermentation, I conceive that the present state of our knowledge does not allow of our comprehending the means by which bodies, whether organic or inorganic, are endowed with the powers ascribed to catalysis; but that we have great reason to believe that these powers, as well as all the properties which ultimate elements acquire by diversity of association, as in compound radicals, are due to the same source as the phenomena of galvanic electricity.

It is well known, that although pure zinc is not susceptible of oxidation by exposure to dilute sulphuric acid, yet that, when containing minute proportions of other metals, as in the case of commercial zinc, it becomes liable to rapid oxidation by the same reagent. This Faraday has explained by the electro-chemical influence of the comparatively electro-negative metallic particles distributed throughout the mass of the zinc, which he conceived to be productive of as many local galvanic circuits with corresponding electrolytic currents. This explanation has, I believe, been universally sanctioned, and was consistent with the previous discovery of Sturgeon, that when, by amalgamating the surface with mercury, a metallic communication was made between the electro-positive and electro-negative particles, so as to prevent the formation of electrolytic currents through the oxidizing liquid, the zinc became nearly as insusceptible of union with oxygen, as when in a pure state.

Nevertheless, either when pure, or when amalgamated,

the zinc was found oxidizable by diluted sulphuric acid, provided it were made the element of a galvanic pair.

The facts above mentioned, having been recalled to the attention of the scientific reader, I beg leave to inquire whether the electrolytic influence thus ascribed by Faraday to the metallic particles, has not a greater analogy with that of a ferment, than those which have been brought forward by Liebig, Kane, and others, with a view to explain the influence of that class of agents upon mechanico-chemical principles?   Wherefore, may not the distribution of a nitrogenized substance, throughout a mass of inorganic matter, operate as do the metallic impurities in commercial zinc?   The existence of a powerful voltaic series in the gymnotus and other electrical fishes shows that the proximate elements of animal matter, are, when duly associated, as capable as metals of forming the elements not only of simple, but of complex galvanic circuits.

The efficacy of water in exciting fermentation may be referred to its ability to promote electrolysis, and until we are enabled thoroughly to understand the part which it performs in this process, we shall vainly attempt to explain that species of catalysis to which the presence of moisture is indispensable.

ART. II.—REMARKS ON THE REDUCTION OF IRON BY HYDROGEN.

BY WILLIAM PROCTER, JR.
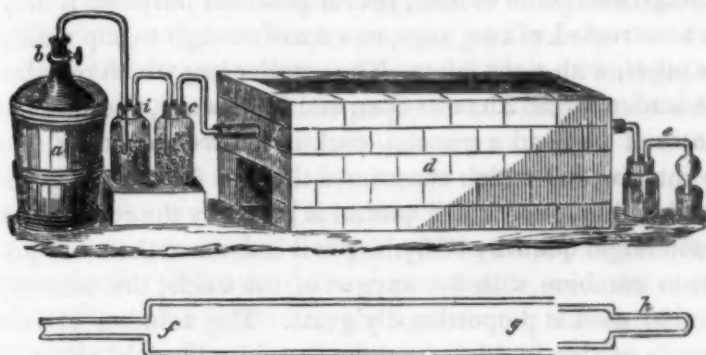
a, b, a self-regulating reservoir for generating hydrogen.
i c, arrangement for washing and drying the gas.
d, furnace with reduction tube enclosed.
f g, sectional view of the reduction tube.

As there has been an increased demand for *"prepared iron,"* or iron reduced by hydrogen, which has chiefly been supplied from abroad at a high price, it has been thought that the publication of a few practical remarks on the apparatus and process, based on a repetition of the operation many times during the past year, will be attended with advantage, notwithstanding that a valuable paper on the same subject by M. M. Soubeiran and Dublanc was transferred from the *Journal de Pharmacie* to the 17th volume of this work.

It need hardly be stated that the " prepared iron" of pharmacy is metallic iron in that minute state of division which it presents when its oxide at a red heat has been deoxidized by a current of hydrogen gas. The elements of the process of manufacture, therefore, consist of means for generating and purifying hydrogen gas, and for containing and

heating the oxide of iron during the passage of the gas and in contact with its particles.

1st. Instead of the flask used by the chemists above-named, and which cannot be well regulated, I have used a self-regulating gasometer, $a\,b$, which has several advantages. Though best made of lead, yet for practical purposes it may be constructed of two kegs, one small enough to slip within the other, with tight joints. The smaller keg which replaces the leaden vessel b has its open end downward, and into the centre of its head a gas stop-cock is screwed, opening into its interior, and which constitutes the exit for the gas gene-rated within, over which control is given by the cock. As a much larger quantity of hydrogen is consumed than is requi-site to combine with the oxygen of the oxide, the amount of zinc used is proportionally great. The solution of two pounds of zinc in diluted sulphuric acid will yield about as much hydrogen as is requisite to deoxidize the same weight of sub-carbonate of iron, but in practice three or four times this amount will be required, as especially towards the last of the process a large amount of gas passes unused. About 6 lbs. of zinc scraps and 8 lbs. of oil of vitriol diluted with six times its bulk of water, are the proportions best adapted for decomposing two pounds of the sub-carbonate of iron.

2d. The jars i, c, which should be of three or four quarts ca-pacity, contain water and lime; i is half-filled with water, and is connected with the stop-cock of the gas generator by a leaden tube which dips below the surface of the water. An-other tube connects i with the jar c filled three-fourths full of fragments of unslaked lime, and reaches nearly to its bot-tom. A third tube connects c with the end of the reduction tube which passes through the furnace d, and a section of which is represented at f, g, h.

3d. The reduction tube that I have employed is made of wrought iron, is thirty inches long and four in diameter. One end is open, the other closed, with the exception of an orifice of one inch in diameter into which an iron tube 12 inches

long is firmly screwed. The open end of the tube is closed by the hollow iron stopper *h*.

4th. The furnace consists of an oblong enclosure of bricks without mortar. After the first two layers a number of iron rods are placed transversely to support the fire, then two or three layers on this making the interior 9 inches wide, 36 inches long, and 6 inches deep to the grating.

5th. The arrangement *e* consists of a common half-gallon glass jar connected with the reduction tube on one side, and from the other a bent tube issues with a bulb near the extremity, the open end dipping in water. Having prepared the apparatus, the next step is to choose the form of of oxide of iron to be treated. MM. Soubeiran and Dublanc employed the anhydrous sesquioxide, and the sub-oxide obtained by calcining the oxalate. I have used the sub-carbonate of iron (precipitated carbonate) of the shops with perfect success, and this is the form most readily attainable. It should be absolutely free from saline matter, as sulphate of soda or potassa, because these salts are de-oxidized by hydrogen, and sulphurets of potassium and sodium formed, which even in minute quantity give a sulphurous taste to the iron as well as attract moisture.

Having the apparatus and oxide ready, a very important step consists in introducing the latter into the reduction tube in such a manner that it will expose a very large surface to the action of the gas. Soubeiran and Dublanc used a succession of flat shelves of wire gauze kept apart by small iron bars. This is inconvenient because of the small diameter and great length of the tube. A better plan is to provide pieces of wire gauze seven-eighths of the length of the tube, and from three to six inches wide, bent in a semi-cylindrical shape. The widest is then covered with a layer of sub-carbonate about a quarter of an inch thick; on this another gauze is placed, and likewise covered with the sub-carbonate, and gauze after gauze with iron intervening is thus built up until the pile assumes a size almost equal to the

capacity of the tube ; a gauze is then placed over the top—
a few turns of annealed wire drawn around the whole, and
the mass slipped carefully into the tube until it approaches
within half an inch of the opposite end.

The iron stopper h is now covered externally with a soft
lute composed of fine clay, lime and white of egg, and water,
and inserted into its place about a line beyond the edge of
the tube, and a few tacks driven between the stopper and
tube to render it immovable ; the whole end is then carefully
luted and dried ; as the luting cracks by drying, it is best
to cover it finally with a mixture of clay and lime and
water, with one-twentieth of borax, which forms a fusible
coating. I have been thus minute in reference to the luting
because of the inconvenience first experienced by the hy-
drogen issuing from the joint whilst in the fire, to the cessa-
tion of its escape at the terminal point of the apparatus thus
depriving the operator of the only means of judging of the
progress of the reduction.

The filled tube is now inserted in the furnace, its re-
spective ends connected with the other apparatus, the
joints well cemented with the lute before described, and
all is ready to proceed :—the stopcock of the gasometer is
opened, and the gas suffered to flow through the apparatus
until all the air is displaced, the fire is then built around the
tube with charcoal and anthracite, and as soon as the tube
arrives at a dull red heat the gas is allowed to flow in ra-
pidly. The success of the operation depends on the regu-
lation of the heat more than on any other feature in it. If
too little, the deoxidation is not accomplished ; if too great,
as a bright cherry red heat, the particles are conglomerated or
welded together, and the quality of the product injured. A
dull red heat, regularly kept up throughout the whole length
of the tube is the best criterion to govern the operator.

The half-gallon jar in the terminal arrangement should
be well refrigerated, which condenses the aqueous vapour
and permits only the excess of hydrogen to escape, and the

relative volume of the gas bubbles passing through the water in the washing jar, and that at the terminal tube, will give the best index of the consumption of the gas. Besides, the amount of water condensed is also a means of judging. Assuming the sub-carbonate of the Pharmacopœia to be in a hydrated condition, about 14 oz. of water should be evolved from 32 oz. of the sub-carbonate. When the latter quantity of material is operated on, the process is occupied from 5 to 8 hours. The current of gas should be kept up after the removal of the fire until the apparatus cools to the ordinary temperature, but in small quantity. This is necessary to exclude the air, because the reduced iron if exposed to the atmosphere whilst hot instantly takes fire and is converted into sesquioxide.

When cool, the stopper and luting is carefully removed, and the gauze drawn out on to a sheet of paper. What was a solid mass at first is now a series of pieces of wire gauze covered with the iron in pulverulent slightly cohering masses of an iron grey colour and occupying about one-eighth of the former space. The pieces of gauze are carefully separated and examined. If any part of the iron is black instead of *iron grey*, it must be separated from the rest, as it is not fully deoxidized, and is very insoluble in diluted sulphuric acid. When the iron is perfectly reduced and pulverulent, it effervesces like a carbonate when thrown into dilute acids; this, together with its light colour, and freedom from taste, are the best criteria for judging of its quality. When a small mass is struck with a smooth hammer on an anvil, it is compressed into a scale with a brilliant metallic lustre.

Some are impressed with the idea that this operation is attended with much danger, which is not true if the directions above given are followed. On two occasions I have had explosions resulting in the entire destruction of the jar containing lime, but this was before I was aware of the necessity of using so large an amount of zinc. In renewing

the latter in the gasometer, notwithstanding the precaution
was taken to close the orifice of the tube i, and subsequently
to expel the air from the gasometer before attaching it to
the washing bottle, yet sufficient air had made its way in
to cause an explosive mixture when the current of hydro-
gen was re-established.

ART. III.—NOTE ON CUCUMBER OINTMENT.

By William Procter, Jr.

An ointment prepared from the juice of the common cu-
cumber, has long been known in French pharmacy, and
has recently been introduced into this city by our colleague
Elias Durand, who has prepared it for several years past.
It is employed as an emollient application, and when
well made is a good preparation in all cases where the
ung. aq. rosæ, is used, and an emollient ointment wanted.

The process of making cucumber ointment consists of
three distinct operations: 1st, the extraction of the juice of
the green fruit in the state of advancement that it is usually
eaten; 2d, the preparation of a simple ointment; 3d, the im-
pregnation of this ointment with the odorous principle of
the juice.

Seven pounds of cucumbers are pared and rasped, or
sliced and bruised, and the juice expressed from them in
any convenient manner so as to exhaust the pulp, and the
juice strained through muslin, or a fine seive.

Twenty-four ounces of the purest lard, and fifteen ounces
of selected veal suet cut in pieces, are fused together in a
suitable vessel by means of a water bath heat; a little rose
water (4 oz.) is added and agitated with the melted fat, and

the whole thrown on a muslin cloth, allowed to pass with-
out pressure, and suffered to repose till cool, that the moist-
ure may separate. The ointment thus prepared is placed
in a deep wide-mouthed earthen vessel, so arranged as to
keep the ointment in a soft semi-fluid consistence, and one
third of the juice added and beaten with the ointment until
the fats of the latter have extracted all or nearly all the
odour from the liquid, which requires several hours. It is
then allowed to stand until the fluid separates that it may
be decanted, and another third of the juice added. This is
beaten in like manner until exhausted, then decanted, and
finally the last third added and similarly treated.

The ointment is now heated by means of a water bath
for an hour in a close vessel, allowed to repose for 25 min-
utes, that the coagulated albumen of the juice may rise to
the surface and be removed with a skimmer. The clear
melted ointment is then carefully ladled out, so as not to
disturb the sediment, and strained into glass or close-text-
ured stone jars of moderate capacity and closely stopped.

This is the proper form to prepare it for long keeping,
but before using it, a quantity to suit the demand of a
month is placed on a warm mortar or other vessel, until
softened, and then beaten with a wooden spatula until it
assumes a perfectly white and creamy appearance. It is
then again introduced into the jars without allowing any
unfilled interstices, covered with rose water and stopped.

With these precautions cucumber ointment readily keeps
from season to season. There are several formulæ for this
preparation which vary in the proportion of juice, and the
manner of incorporating its odorous principle, but the above
embraces all the points essential to success.

ART. IV.—VALUE OF OPIUM IMPORTED AND EXPORTED FROM 1827 TO 1845.*

Yrs.	VALUE IMPORTED FROM						VALUE EXPORTED TO					
	England.	Turkey.	France.	Italy and Trieste.	Other places.	Total	Dutch E. Indies.	Gibraltar and Br. E. Indies.	China.	Asia.	Other places.	Total.
1827	$12,984	$372,191		$664	$1,722	$387,561	$9,488	$81,859	$301,804	$400	$739	$394,290
1828	5,728	144,675	$2,982	9,713	432	163,530	1,521	515	135,605		2,158	139,799
1829	1,690	92,924	12,187		370	107,171	8,011		103,247	6,214		117,472
1830	1,623	132,222	467		5,284	139,596	17,625	5,532	69,392	9,766	470	102,785
1831	26,215	149,359	533		599	176,736	75,720		650	15,020		91,390
1832	1,466	234,473	3,905		4,040	243,884	52,568		1,558	41,984		96,110
1833		87,638				87,638	28,163		11,043	13,954	519	53,679
1834	5,150	99,700		2,580	2,570	110,000	29,188		16,548	14,764		60,500
1835	38,204	62,109	48,071	14,836	9,195	172,415	9,790		50,925	1,957		62,672
1836	33,178	420,911	6,451	3,507	5,849	469,896	147,176	3,725	118,470	13,616	2,625	285,612
1837	9,715	42,715	1,425	2,954	252	57,061	12,171		52,221	38,887	2,441	105,720
1838	12,833	64,969	1,450		4,474	83,726	9,933			6,720		16,653
1839	22,887	191,764	5,105	5,795	29,424	254,975	5,870			10,192	420	16,482
1840	3,018	26,692	414	7,747	3,003	40,874	4,533			4,850	3,275	12,658
1841	38,298	205,933	910	2,500	7,868	255,599	5,198			10,211	1,557	16,966
1842	17,677	19,836			965	38,478		960		8,215		9,175
1843	3,000	15,393				18,393			900	12,661		13,561
1844	7,062	53,055	920		3	61,040	5,296		7,321	6,232	3,538	22,381
1845	25,530	7,755	104	324	3,925	37,638		336		18,210	376	18,922
	$261,138	$2,434,614	$84,924	$48,130	$77,405	$2,906,211	$422,251	$92,927	$869,684	$233,853	$18,118	$1,636,833

Exported, - - - - - - - $1,636,833

Consumed and on hand, - - - 1,269,378

Average Annual Consumption, - 66,809

* Derived from the records of the Treasury Department at Washington, and communicated for this Journal by Dr. J. B. Biddle of this city.

ART. V.—ON THE PROPERTIES OF THE ASCLEPIAS CURAS-SAVICA, OR BASTARD IPECACUANHA.

By W. Hamilton, M. B.

Among the most frequent weeds which infest the pastures in most of the West Indian islands, Nevis and St. Kitts more especially, there are few more attractive to the eye, or more injurious to the cattle that feed upon it. than the Asclepias curassavica, known to the English inhabitants by the names of *Bastard Ipecacuanha* or *Redhead;* the former of these names being derived from the emetic property of its roots, and the latter from the colour of its umbel of flowers.

The Bastard Ipecacuanha is a plant with an herbaceous stem of from one to three feet in height, abounding in a milky sap, bearing umbels of bright red flowers to be met with at all periods of the year. Browne and Swartz both speak of a variety with white blossoms, common in the cooler parts of Jamaica. But I found an Asclepias with blossoms of this description growing in the immediate vicinity of Cape Henri, Hayti, which possessed characters sufficiently distinct from the Asclepias curassavica, and which appeared, as far as my experience went, to be invariably and unchangeably perpetuated from its own seed, a character not altogether consistent with the commonly received idea of a variety. Among other differences which must distinguish the Asclepias nivea from the Asclepias curassavica, independent of the colour of the blossoms and the general appearance of the plants, is the form of the leaves, which I have observed in the latter to be almost invariably *ovate lanceolate,* and in the former as invariably linear-lanceolate ; such at least was the remark entered in my notes at the time ; as, although the Asclepias curassavica with its red blossoms is a sufficiently common inmate of our collections in Europe, it has never been my fortune to meet a plant

bearing the most distant resemblance to it, producing white blossoms, since I quitted Hayti. The Haytian plant appears in the form of its leaves to correspond with Plumier's *Apocynum Americanum Amygdali foliis longioribus, sp.* 2, *l.c.* 30. I met it in blossom in the months of June, July, and August ; but while the Asclepias nivea is so abundant near the Cape, I experienced the greatest difficulty in obtaining a specimen of the Asclepias curassavica, which is so very common at Nevis and St. Kitts. Of the properties of the Asclepias with white blossoms, I can find no memorandum among my papers, but believe they were not regarded as different from those of the Redhead.

The root of this last contains an emetic principle, varying so much in the degree of its activity, as to render its operation dangerous and uncertain; and has hence occasioned its dismissal from regular practice. Among the poorer whites and blacks, however, it is occasionally employed as a cheap substitute for Ipecacuanha, the powdered root being administered, after having been previously infused in warm water and then dried, in doses of from one to two scruples. The same emetic property resides in the expressed juice, which is exhibited internally to the extent of an ounce or more.

The uncertainty which attends the emetic operation of this plant arises most probably from inattention to the proper season of gathering it : a similar uncertainty attending all the more active articles comprising our Materia Medica, which are derived from the vegetable kingdom ; of which the Piscidia erythrina in the West Indies, and the Digitalis purpurea, and Colchicum autumnale in Europe, furnish familiar examples. The age of the moon also is another circumstance which demands consideration in connection with the season of the year; since whatever sceptics, whose range of observation has been confined within the limits of the temperate zones, may think, all who have a practical acquaintance with the perennial vegetation of the topics, are fully

aware of the powerful influence which the lunar phases, in conjunction with the solar heat, exert over the circulation of the sap.

Might not the emetic principle be obtained in a detached form from the decoction or infusion of the root, or of the whole, plant? or from the expressed juice? and if so, might it not be made a profitable object of trade with those islands in which it is found in such inconvenient profusion? These are questions calculated to repay the labour of solution.

But it is not for its emetic properties alone that the Asclepias curassavica is entitled to attention. It is a powerful astringent, and as such eminently serviceable in checking hæmorrhages; from which it has acquired, among the inhabitants of Jamaica, the name of the *blood-flower*. Dr. Barham illustrates this by the case of a gentleman who had been long suffering from hemorrhoidal hæmorrhage, for which all the ordinary routine of practice had been exhausted without effect, and his life was despaired of by his friends. "At last," as the doctor acquaints us, "he was advised to use this flower, which was immediately got (for they grow almost everywhere) and bruised, and the juice pressed out," which was injected by a syringe, and effectually arrested the progress of the bleeding.

He also found it equally effectual, as an internal remedy, in the cure of gonorrhœa; and mentions two cases in which he employed it with the most satisfactory results. In the first of these cases he had exhibited every remedy he could think of during a space of twelve months, without affording his patient the smallest relief. Baffled in all his attempts, he at length had recourse to the blood-weed, which he administered in the form of a decoction, made from the stems, leaves, and flowers, which was taken twice a day for about a week, when the discharge ceased, and never returned afterwards. In the second case, which from Dr. Barham's account, appears to have been one of seminal weakness, rather than virulent gonorrhœa, he recommended to his patient, an

elderly gentleman, who had been labouring under this infirmity for years, an infusion of the blossoms of the Bastard Ipecacuanha, in place of his ordinary tea at the usual hours, for a month, at the expiration of which time he found himself perfectly recovered, and declared, to use the doctor's own words, " that it was worth its weight in gold," adding that " he believed if a man could make it known in Europe, he would get an estate by it." Dr. Barham speaks of having used it with equal success in a multitude of other cases of the like nature ; and suggests a trial of it in leucorrhœa and other disorders of females.

A syrup prepared from the expressed juice, in doses varying from a teaspoon to a table-spoonful, is employed as a powerful vermifuge after other anthelmintics have failed. It operates frequently, as Grainger remarks, both as an emetic and a purgative, and he says, he has seen the most surprising effects from its exhibition. Dr. Wright also speaks favourably of its properties, and recommends the juice of the leaves, to the extent of from a teaspoonful to an ounce taken on an empty stomach, in worm cases ; and says, that he can vouch for its powerful and salutary effect when administered in this manner. He objects, however, to the powdered root as unsafe, no doubt from the uncertainty of its operation and the difficulty of ascertaining, in consequence, the proper dose to produce the desired effect. This is an objection, however, which might perhaps be obviated in a great degree, if not altogether, by attending to the suggestions already given. Besides its emetico-cathartic operations in worm fevers, Dr. Wright says it acts on the urinary organs and the skin.

In the unpublished manuscripts of the late Dr. Anthony Robinson, the following instances of its styptic and antiseptic properties are given, and preserved by Lunan in his *Hortus Jamaicensis*, vol. 1., p. 65.

" Mr. Thomas Nicol, a practitioner in physic, informed me, upon my telling him of the styptic virtues of the Pseudo-Ipecacuanha, whichBar-

ham calls *blood-flower*, that a mule had, by some accident, been wounded in the thigh, from which a violent hæmorrhage of blood issued, which, after the ineffectual application of all the styptics in his shop, was stopped instantaneously by a negro applying a handful of the blossoms and leaves of this plant. Another time, by the use of the same plant, applied in the same manner, he saw an ass, with a large ulcerated wound, full of maggots, cured effectually : for it immediately killed the maggots, and then, cleansing the wound, healed it."

Such are the strong testimonials to the value of a plant which Heaven has bestowed with the most lavish profusion upon most of the islands composing the Archipelago of the West Indies, but which man, in the blind pursuit of unhallowed gain, contemptuously rejects, or ignorantly overlooks; and yet, when the hurricane has swept the cane from the grounds of the planter, or the drought has blighted his hopes of 'a profitable return, the lowly blood-weed might contribute its modest aid to lighten the burthen of his losses, and repair the ruinous effects of these fearful visitations.

The root of this weed, which calls for no care in its cultivation, and is exposed to but few casualties in its growth, which imposes no intolerable labour on the husbandman, and awakens little anxiety in the bosom of the planter, if gathered at the season of the year in which its properties are most active, and dried in the same manner as that of the Rheum palmatum, or, which may probably be a preferable mode, the alkaloid or other active principle on which its emetic quality depends, extracted on the spot, may yet furnish a valuable addition to the imports from our colonies, and contribute, in some degree, along with other hitherto neglected objects of industry, some of which have been already pointed out, to lighten the evils of bad seasons and the uncertainties of cane and coffee cultivation.

I regret much having omitted, while on the spot, to investigate the properties of the Asclepias nivea, which I too hastily assumed to be identical with those of the Asclepias curassavica. An examination of these properties, and a de-

termination of the question, started by Browne and Swartz, at to their being but varieties of one species, and points worth the attention of those whose residence on the spot enables them to apply themselves to their solution.—*Lond. Pharm. Journ.*

ART. VI.—CONCENTRATION OF COMMERCIAL NITRIC ACID.

MR. REDWOOD laid before the Pharmaceutical meeting a specimen of very strong nitric acid, obtained by concentrating the ordinary nitric acid of commerce. He observed that as an unusual demand had recently arisen for the strongest nitric acid, in consequence of its use in the preparation of *Gun Cotton*, he thought it might be acceptable to some of the Members of the Society, to be informed of an easy and economical method of making such an acid. Independently of the requirement of this acid for the purpose to which he had alluded, the Pharmaceutical Chemist was directed to use nitric acid of sp. gr. 1.5, in some of the preparations of the Pharmacopœia, and therefore ought always to be able to obtain it when required. Acid of this strength was not commonly met with in commerce. Some of the manufacturers had recently commenced supplying it; but, as it is very prone to undergo decomposition, especially if exposed to the light, and as the water of the decomposed portion is transferred to that which remains, it could not be kept for any length of time without becoming weaker that the specified strength, and therefore ought to be made in small quantities as required. The process which he recommended for concentrating commercial nitric acid, consisted in mixing it with oil of vitriol, and submitting the mix-

ture to distillation with a gentle heat.   If commercial nitric acid, sp. gr. 1.42, be mixed with its own volume of oil of vitriol, and distilled by the heat of a sand-bath cautiously applied, a quantity of acid, equal to two-thirds that of the nitric acid introduced, might be drawn over, and this acid would have a specific gravity of 1.514 to 1.52.   This process had been recommended some years back by M. Millon, and it was the process alluded to in the last number of the *Pharmaceutical Journal,* in the paper on Gun Cotton. Millon and other chemists, however, had stated that the nitric acid thus obtained, was always contaminated with sulphuric acid.   Had this been the case, it would have entirely precluded the adoption of the process for preparing nitric acid for pharmaceutical purposes, but he, (Mr. R.) had found, from repeated experiments, that if care was taken not to apply more heat than was necessary to bring over the nitric acid, and not to push the distillation too far, the distilled acid was quite free from sulphuric acid, and was in every respect as pure as that made by the process of the Pharmacopœia.   In some respects, this process possessed advantages over that of the Pharmacopœia; the acid produced was stronger, and was less coloured by nitrous acid.   His object, in alluding to the subject on this occasion, had merely been to direct attention to an easy and economical method of obtaining the strongest nitric acid that could be made, and at the same time to correct an error which had prevailed, to the effect that acid, so prepared, was not pure.—*Ib.*

ART. VII.—ON THE OIL OF MONARDA (HORSE-MINT.)

By A. E. Arppe.

The oil of *Monarda punctata*, which is officinal in the United
States, separates readily into an elæoptene and stearoptene.
The first forms a yellowish-red fluid, which possesses the odour
of thyme, and passes over when distilled with water of a bright
yellow colour. The oil, thus purified and freed from water,
boils at 435° F., when it becomes of a darker colour. As it
cannot be assumed that this oil, the boiling-point of which ap-
proaches so closely to that of the stearoptene, was obtained
perfectly free from the latter, no safe conclusion as to its com-
position can be expected from the analysis, which yielded 86.41
per cent. C, 9.85 H, and 3.74 O. Exposed to the air, or
placed in contact with substances containing much oxygen, it
very easily changes to a resin, becoming brown and thick, and
exhibits on analysis a considerable decrease in the amount of
carbon.

The stearoptene forms large crystalline fragments, which
are coloured yellowish by the adherent fluid oil, and the odour
of which has a striking resemblance to that of thyme. It can
be obtained perfectly colourless by pressure between blotting
paper, and quite pure by distillation either alone or with water.
When submitted alone to distillation, the product solidifies in
the recipient immediately, and forms very distinct crystals of
remarkable lustre, which retain the above-mentioned odour
and have an acrid burning taste. It leaves on distillation a
small quantity of a brown resinous mass, which is soluble in
alcohol. When the crystals thus obtained are distilled with
water, they melt to an oil, and appear to undergo some change,
as during ebullition the oil floating on the water becomes
brownish; however, it distils over entirely, and the residuary
water, which is wholly destitute of smell, has only a faint
brownish tint. The distillate floats as a colourless oil on the

water, and exhibits the remarkable property of retaining its
fluid state for a very long time; but congeals, on being touched
with a hard body, immediately at the point of contact, and
extending rapidly over the entire surface of the oil. The
greater portion forms large regular crystalline plates, but a few
drops change into small spherical tufts. The crystals or
spheres thus produced are distinguished by their opacity and
their decomposed appearance from those obtained by the dis-
tillation of the stearoptene alone. To render them transparent
and lustrous, it is only requisite to melt them and allow them
to solidify; but if melted frequently, the stearoptene passes into
the non-crystalline state, without its being possible to state
more precisely what conditions give rise to this peculiar beha-
viour. When the fluid stearoptene is touched with a hard
body, the formation of crystals begins again, and the crystals
are for the most part opaque; but in general it must have re-
mained for some time in its fluid state before it can be thus
brought to solidify. The stearoptene melts at 119°, and soli-
difies at 101°; when heated to 158°, it solidifies at 93°, when
the thermometer rises again to 101°; heated to 221°, it con-
geals at 92°, upon which the thermometer ascends to 99°;
heated at 284°, it solidifies at 88°, and the thermometer sub-
sequently ascends to 96°; lastly, when heated to 338°, it soli-
difies at 81°, and the thermometer ascends to 95°. Its boiling
point is 428°.

These numbers show that the point of solidification descends
as the heating point rises, and that the liberated heat amounts
up to 275° only to 7°, but at 338° it is already 14°. At this
temperature, when more caloric is set free, its tension is greater
and its escape easier, which facilitates crystallization; to which
is likewise owing the circumstance, that the stearoptene, when
distilled alone and consequently heated to 228°, cannot persist
in the fluid modification; on the contrary, when distilled with
water, all the conditions requisite to its production are given.

The stearoptene is very easily soluble in æther, and espe-
cially in alcohol, and separates in crystals from both solutions

on spontaneous evaporation. The substance was purified for analysis by three distillations, and the combustion made in a current of oxygen. The author found—

Carbon,	79.77	79.88	80.00	10	80.00
Hydrogen,	9.25	9.50	9.52	7	9.33
Oxygen,	10.98	10.62	10.48	1	10.67

If we regard this stearoptene as an oxide $= C^{10} H^7 + O$, we find such a relation between its composition and that of the elæoptene from which it separated, that it may assume in the elæoptene 3 atoms of the same radical combined with 1 atom of oxygen $= 3C^{10} H^7 + O$, with which the per centage composition found agrees tolerably well.

When dry muriatic gas is passed over the solid stearoptene, it very quickly becomes brown, and after removal of the excess of acid purple-coloured. The effect is the same whether the mass be warmed or heated to boiling; on cooling it separates in dark purple crystals, which however consist for the greater part of unaltered stearoptene, as was to be expected, since the total increase in weight did not amount to more than 2 to 3 per cent. On distilling the coloured crystals in a small retort, the stearoptene first passes over quite colourless, but the red compound likewise distils over unaltered. Caustic alkali turns the red colour to blue, and on the application of heat into eme-rald-green, both which colours gradually return to red on expo-sure to the air. The red mass yields a beautiful blue solution with hydrate of barytes. When carbonic acid is passed into this, the baryta is precipitated, and at the same time the colour-ing substance, which imparts a blue colour to the precipitate, which colour however subsequently becomes red. At last the entire precipitate is bright red and the precipitate colourless. The red colouring substance can be extracted with alcohol from the red baryta compound, and obtained in a solid state by evaporating the alcohol as a dark violet amorphous mass. It is volatilized by heat as a red gas, resembling indigo-blue, con-tains chlorine, and can be distilled without decomposition.—
Chem. Gaz. from Liebig's Annalen.

ART. VIII.—ON THE PRODUCTS OF DECOMPOSITION OF GELATINE BY CHROMIC ACID.

By A. Schlieper.

The best proportions for oxidizing gelatine by chromic acid are those pointed out by Prof. Marchand, viz. 2 parts ordinary glue, 8, of bichromate of potash, 15 of sulphuric acid, and 50 parts of water.   The amount of sulphuric acid may be somewhat diminished, but not increased, otherwise the operation would not succeed, and nothing but formic acid would be obtained.   The glue is first allowed to swell in the water, and the sulphuric acid then added ; when the mixture has cooled, it is poured into the retort containing the bichromate in the state of a fine powder ; distillation is now commenced, taking care to cool well, and the operation discontinued when the mass begins to swell.   The distilled product is turbid, has an acid reaction, and a strong odour of prussic acid, of which it contains a large quantity.   It is redistilled over oxide of mercury, collecting only the first portions ; as soon as the liquid which passes has lost its aromatic odour and is decidedly acid, it is tolerably certain that all the oily constituents have passed over.   The product amounts to from one-fifteenth to one-twentieth of the whole.   After having separated the oily portions, the recipient is changed and the distillation continued ; a turbid liquid now passes, which contains the volatile acids in solution; it is neutralized with barytic water, and after evaporation the barytic salts decomposed by sulphate of soda, and the soda salts submitted to distillation with dilute sulphuric acid.   The product thus obtained is a concentrated aqueous solution of the volatile acids; it has a strong smell of vinegar and cheese.   To effect the separation of the acids, the liquid is saturated with carbonate of soda and evaporated to dryness, the dried soda salt reduced to powder and agitated with dilute sulphuric acid (1 part of acid to 3 of water) in a narrow cylin-

3*

drical glass. The liquid separates into two strata: one is aqueous, and crystallizes in part; the supernatant one is oily. From the analyses of the author, it results that the latter is a mixture of *acetic* and *valerianic* acids; the crystallizable acid possessed the composition and all the characters of *benzoic* acid.

The *prussic* acid had remained in combination with the oxide of mercury in the form of a basic cyanide $= HgCy + HgO$, which has been described by Berzelius in his 'Manual of Chemistry,' vol. iii. p. 871.

The author has established the identity of the preceding bodies by analysis.

To extract the volatile oils produced by the action of the chromic acid, the aqueous portions which passed first were repeatedly rectified, each time collecting only the first portions which were then in their turn rectified. In this way there was finally obtained an aqueous liquid, upon the surface of which the volatile portion had separated in the form of an oil; the water was saturated with chloride of calcium, decanted, and rectified over fused chloride of calcium. This oil contains two peculiar bodies, which are separated by the difference in their boiling-point.

Valeronitrile is the least volatile oil, very fluid, limpid and colourless; it is lighter than water, and has a density of 0·81; it dissolves to some extent in water, and distils readily with the vapour of water; it is neutral, and possesses an acrid aromatic taste; its odour resembles that of oil of bitter almonds, or of hydruret of salicyle. It burns with a white luminous flame, and is composed of $C^{10}NH^9$. Hydrochloric and nitric acid have no action upon it, but sulphuric acid converts it into valerianic acid, which is set free, and into sulphate of ammonia. It is not altered by ammonia. It dissolves in alcohol and æther in every proportion, and it boils at 257°F. It is attacked by chlorine and bromine when exposed to the rays of the sun.

Valeracetonitrile is a volatile oil of a similar odour to the preceding substance, but more agreeable. It boils betwixt

154° and 158°F.; its density is 0·79 ; its taste is acrid.   On analysis it was found to correspond to $C^{26}H^{24}N_2O^6$.

Ammonia, hydrochloric and sulphuric acids do not alter it, but concentrated sulphuric acid decomposes it in a similar manner to the preceding body, and there is formed sulphate of ammonia, while acetic and valerianic acids are set free.

When chlorine is passed into it the liquid becomes heated, and on cooling deposits beautiful crystals of a chlorinated compound.   Bromine acts in the same manner, giving rise to two bodies, one crystallizing in small needles, the other liquid, and which violently attacks the eyes and olfactory organs.

Towards the end of the distillation of the crude product yielding the two preceding oils, the author obtained a heavy oil, which had the smell of cinnamon ; but he was not able to investigate it more minutely, from want of material.—*Ibid, from Liebig's Annalen.*

ART. IX.—ON THE MALAMBO BARK OF THE PROVINCE OF CARTHAGENA, SOUTH AMERICA.

By W. Hamilton, M. B.

In the third volume of the *Pharmaceutical Journal,* page 169, I observed an interesting and instructive paper, by Mr. Ure, on the *Malambo* or *Matias* bark, of New Granada, with some notice of its sensible qualities.

Having, as far back as the year 1825, received a portion of bark, under the former of these names, from my indefatigable correspondent, Edward Watts, Esq., British Consul at Carthagena, accompanied by extracts from some of the Spanish writers on the natural history and productions of that province, detailing its medicinal properties, but without

furnishing any clue to the localities in which it is to be found, or the botanical character of the tree from which it is obtained, I turned with some eagerness to Mr. Ure's paper, in the hope of meeting in it some portion of that information which I had failed to procure from other sources; but in this expectation I was disappointed.

It appears from Mr. Ure's paper, that a bark, known by the name of *Malambo*, was received in Europe at least nine years before the date of the letter which accompanied the specimens sent home from Carthagena by Mr. Watts, of which an analysis, made by M. Cadet Gassicourt, appeared in the 2d volume of the *Journal de Pharmacie*, and a second analysis, by the celebrated Vauquelin, is to be found in the 96th volume of the *Annales de Chemie*, from which, as Mr. Ure's paper informs us, the active constituents of the bark appear to be an aromatic volatile oil, a very bitter resin, and an extract soluble in water; but neither tannin, or any of the alkaloids of cinchona, were found, and only a slight trace of gallic acid.

But in the absence of a satisfactory description of the botanical characters, we are unable to determine the identity of the several specimens submitted to examination, and it remains as much a question as ever whether the tree which furnishes it belongs to the genus *Drymis*, as many botanists conjecture—to the genus *Quassia*, as M. Bonpland somewhat hastily concluded, or to some genus not hitherto submitted to botanical examination.

I regret my inability to throw more light upon this part of the subject than those who have preceded me; but, as connecting links in the medical history of a substance which, although known in Europe for upwards of thirty years, still slumbers in mysterious obscurity, and is far from being appreciated to the extent it merits, the following fragments of its local history may not be deemed wholly misplaced among the Transactions of the Pharmaceutical Society.

In a work, on the natural productions of the province of

Carthagena, by Don Jorge Lopez,* the date of which I unfortunately do not possess, that writer states:

"Se dia, en la Provincia de Cartagena, un arbol de la misma altera de los *Quino-*, nombrada MALAMBO, cuja corteza, en mi concepto, tiene qualidades mas recommendables que le *Quina;* ella abunda de un *Aromatico* tan constante y penetrante que jamas lo pierde, y por supuesto abunda tambien de partes *gomosas* muy utiles, à mi ver, a la naturaleza; es indigena de esta Provincia, y *se encuentra con abundancia.* Su corteza es que hablo, y creo que si se dedicasen los facultativos à hacer uso de ella, *la Quino perderia su concepto.* En este pais la, aplican à diversos males con ventaja conocida, en particular yara los *pasmos, heridas, inflamaciones, males del estomago.* A mi ver produciria un efecto admirable en la *hydropesia* y *fiebres malignes;* por varias observationes que se han hecho, es eficax para las *asmas, rheumatismo, disenteria, supreciones de menstruas.* En fin, en el pais, y, en particular, en los campos, es un remedio general aplicado, con felix suceso, en todas las enfermedadas referidas."

"A tree exists in the province of Carthagena, of the stature of the cinchona, called the *Malambo,* whose bark, in my opinion, possesses qualities far superior to those of the cinchona. It abounds in an aroma, so durable and penetrating, that it is not impaired by any lapse of time, and must, therefore, I imagine, consist of gummy particles of great value to man. It is a native of this province, and very abundant. I speak of its bark, and were the faculty to employ it, cinchona would sink into disrepute. It is employed with known advantage in this country, in the treatment of various complaints, especially in spasms, wounds, inflammations, and disorders of the stomach. It would, I think, be highly beneficial in cases of dropsy and malignant fevers. Experience has proved its efficacy in asthma, rheumatism, disentery, and menstrual obstructions, in my own practice. In fine, here, and in the country especially, it is an universal remedy, employed with the happiest effect in all the above-named complaints." In another rare and

* Don Jorge Lopez was an Apothecary, residing in the town of Carthagena, near the British Consulate, at the time Mr. Watts was there.

valuable Spanish work, in the possession of Mr. Watts,
and from which that gentleman also favoured me with an
extract, it is spoken of as follows:

"El tercero* es el Malambo, enja corteza aromatica es un antipasmo-
dico eminente, de un amargo may activo, febrifugo, y astringente.   Lo
hay con abundancia en la Provincia de Santa Maria, donde la aplican
para curar *pasmo, calenturas, intermittentes,* y la *dysenteria;* y tambien
se encuentra en varios territorios de esta Provincia.   Se hacen algu-
nas extracciones de su corteza para la Habana, y alli lo usan con
mucho suceso contra el *pasmo* àque son muy propensos los negros; y
desde que tienen este specifico, casi no muero ninguno de el.   Acqui
no se aplica para nada, y hace pocos dias hemos, vista morir un joven
apreciable, por no haberle dado en tiempo este remedio.   Es un vege-
tal importantissimo, que merece la atencion del Gobierno por las virtu-
des, que dexamos expuestas, y aplicaciones que se hacen de el en
Santa Maria, como por el color y olor de su corteza, tenemos razones
para creer sea del genero *cusparia, ó quino de Angostura,* de que se
compone parte de la receta del difunto Dr. Mutis, para curacion de la
dysenteria, y no dudamos asegurar que, à falta de esta, puede suplir la
CORTEZA DEL MALAMBO."

" The third is the MALAMBO, whose aromatic bark is a
powerful antispasmodic, containing bitter febrifuge and as-
tringent properties of great activity. , It abounds in the pro-
vince of Santa Martha, where it is employed in the cure of
spasms, intermittents, calentures, and *dysenteries;* it oc-
curs also in various parts of this province (Carthagena.)
The bark is exported to the Havannah, where it is exhi-
bited in the treatment of spasms (*tetanus?*) to which the
negroes are very subject; and since the adoption of this
remedy hardly any deaths arise from this complaint.   Here
we make no use of it; and very lately (in 1810, at Cartha-
gena) we have witnessed the death of a valuable young
man from the neglect of exhibiting this remedy in sufficient
time.   It is a most important vegetable production, merit-
ing the attention of government from the valuable proper-
ties it possesses, and the use made of it at Santa Martha.

*The other three are the Guayacan, Ariza, and Guarumo

Both from the colour and smell of the bark, it would appear to belong to the genus *cusparia*,* or the *cinchona* of Angostura, which entered into the composition of the prescription of the late Dr. Mutis for the cure of dysentery; and we have no hesitation in saying that the bark of the malambo may supply the place of that of the *cusparia*. "

I distributed the specimens of the bark received from Carthagena among my medical friends here, and sent a portion to Dr. Bostock, of Great Coram Street, London. From the former I was unable to obtain any report; from the latter I received a reply, of which the following is a copy, dated London, 11th December, 1825:

"SIR,—I regret that so long a time should have elapsed since the receipt of your letter. When it arrived I was from home; and have, since that time, been very particularly engaged. The account which is given of the bark is certainly very much in its favour, and its sensible properties are such as to render it probable that it may be an useful article of the Materia Medica. The only plan, however, to establish a point of this nature would be to send a quantity of the substance to some hospital or dispensary, where a number of trials might be made of it by any person in that kind of extensive practice. Its taste and odour would make one suppose that it may be found useful in affections of the stomach and bowels, as is the case with *Colombo* or *Angostura;* and even, if its properties were found to be very similar, still, it might be very important to have a variety of articles. As I have no connection with any medical charity, it will not be in my power to give you any assistance, and I think it will be your best plan to apply to some practitioner in your neighbourhood. I am, &c.
J. BOSTOCK."

Such was the abortive result of my endeavours to obtain a fair trial and full report of the value of this bark in practice. Since that time my specimens have been lost, and the subject was almost completely obliterated from my recollection, till the paper, to which I have referred, summoned it from the regions of oblivion, and induced me to

* *Blonplandia trifoliata.* Had this conjecture been well founded, the resemblance must have struck Dr. Bostock, which does not appear from his letter to have been the case.

seek for further information in the faded records of past
correspondence.

Had such a body as the Pharmaceutical Society been co-
existent with the facilities for foreign and colonial corres-
pondence which I then enjoyed, and of which I fully avail-
ed myself for the service of the public, the mystery which
to the present moment involves the tree yielding this valua-
ble bark would most probably have been long since cleared
up, and botanists would not only be familiar with the cha-
racters of the inflorescence and fructification, but our Materia
Medica might have been enriched by an elegant, agreeable
and active tonic.

From the accounts given by the Spanish writers, Don
Jorge Lopez and Don Ignacio de Pombo, the friend and
companion of the lamented Mutis, in the extracts just given
from their respective works, we learn that the MALAMBO
is a tree of common occurrence in the forests of Santa Mar-
tha and Carthagena, and may no doubt be found through-
out the whole of the littoral chain which stretches from
Punta Paria, in the east, to the Gulph of Maracaybo, and
thence westward through the provinces of Santa Martha
and Carthagena to the Gulph of Darien; and as the Flora
of Trinidad is but an extension of that of the continent, it is
by no means improbable that the MALAMBO is also a deni-
zen of those unexplored forests which wave in perennial
verdure beneath the British flag.   It were, therefore, much
to be desired that some of our merchants residing at Santa
Martha or Carthagena, the localities clearly indicated in the
foregoing extracts, could be induced to procure well authen-
ticated specimens of the bark, seeds, fructification, and in-
florescence of the tree so highly spoken of by the writers
already named, and transmit them for examination to the
Pharmaceutical Society, the legitimate body for conducting
such inquiries.   The botanical characters being once clearly
determined, it would be comparatively easy to ascertain its
existence in the forests of Trinidad; or, if its value were

found to correspond with the high character given to it, the seeds might be obtained and plantations formed in Trinidad and others of our islands, which would in process of time add much to the diversity and importance of their exports, and contribute somewhat likewise to the strength of the artillery which the medical practitioner employs to repel the assaults of mortality.—*Pharm. Jour.*

ART. X.—ON THE PURIFICATION OF COBALT FROM ZAFFRE.

By Mr. B. H. PAUL,
Assistant in the Laboratory of the Pharmaceutical Society.

HAVING found that the process for obtaining a salt of cobalt from zaffre, by the use of oxalic acid, was attended with considerable inconvenience, and did not yield a pure product, I have endeavoured to ascertain whether some other more advantageous process might not be employed; and among others it occurred to me that the process adopted by Mr. Phillips for the quantitative separation of this metal from nickel, if somewhat modified, would answer for for the purification of zaffre. This process is founded upon the property possessed by nickel of being precipitated by potash from an ammoniacal solution of the two oxides, while cobalt is unacted upon.

The zaffre of commerce consists essentially of impure oxide of cobalt, obtained by roasting the sulpho-arseniuret of cobalt, or cobalt ore, and mixing the product with a quantity of sand; it contains, besides cobalt, iron, copper, bismuth, and nickel.

This is treated with hydrochloric acid, which dissolves al but the sand, and the liquid evaporated to free it from excess of acid; on the addition of water, a white substance remains

undissolved, which contains so large a quantity of bismuth, as to render it worth preserving. The solution now contains cobalt, nickel, iron, copper, bismuth, and arsenic, and on passing sulphuretted hydrogen through it, copper, arsenic, and bismuth are precipitated; after driving off the excess of sulphuretted hydrogen by the addition of a little hydrochloric acid and boiling, oxides of nickel, cobalt, and iron are precipitated by ammonia, an excess of which dissolves the first two, and iron may be removed by filtration.

To the ammoniacal solution largely diluted with water, that has been well boiled to free it from air, potash is added, which precipitates nickel; it is then filtered, and sulphuretted hydrogen passed through it; this forms sulphuret of ammonium with the ammonia present, which, reacting on the oxide of cobalt, precipitates the sulphuret of cobalt. This, when well washed, may be treated with acids, to form any of the salts.

I have tried this process several times, and find it to answer perfectly; a pure salt may thus be obtained at a very moderate cost, and a considerable quantity of bismuth as a bye product. The objections to the use of oxalic acid are that the nickel cannot be separated thus, as its oxalate is as insoluble as that of cobalt, and that the product being an insoluble salt, requires to be reduced with heat, in order to make the other salts.—*Ib.*

ART XI.—PROCESS FOR PREPARING CANNABINE (?), OR
HEMP RESIN.

By T. and H. Smith, Edinburgh.

The following method for the preparation of hemp resin,
among several tried by us successively, is the one to which we
give the preference ; and, agreeably to promise, we now send
the details for publication in the *Pharmaceutical Journal*.

The plant is, after being bruised, digested in repeated por-
tions of moderately warm water, pressing out at each time till
the water comes away colourless. It is then digested in a
solution of crystallized carbonate of soda, using of this half the
weight of the quantity of dried gunjah operated on. After
macerating at a moderate heat for two or three days, the
liquid is pressed out, and pure water substituted; and this
is repeated till the water comes away nearly colourless.
The washing is for the purpose of removing a large quantity
of brown colouring matter, which we have found it diffi-
cult to remove in any other way than this. The alkali re-
moves a further quantity of colouring matter, along with a
large quantity of a fatty acid, *quite inert*, which may be
got by adding an acid to the alkaline liquid after filtration.
The plant is now dried till it ceases to lose weight, and then
macerated or percolated with strong rectified spirit of wine.
To the spirituous solution a milk of lime, as thick as cream,
is added, containing one ounce of fresh burnt lime for every
pound of the plant. The lime removes any of the fatty
acid and chlorophylle which may have been left by the soda.
After filtration, a slight excess of sulphuric acid is added to
throw down in the state of sulphate the lime left in the
liquid ; for this purpose, one or two fluid drachms for every
pound of the dried plant will be quite enough.— A little
pure animal charcoal is now also added, and shaken with
the liquid for some time. We may mention that the de-
colourizing action of the charcoal is very limited ; for, after
acting with one portion and filtering, and repeating the

process with another, the filtered liquid on comparison will not appear any lighter in colour than the first. The greater part of the spirit is now, by distillation, recovered from the filtered liquid, and the resin washed out with a small quantity of rectified spirit. Three or four times its bulk of water is then mixed with the liquid, and the dish (a porcelain basin) is set aside till the spirit has completely escaped by evaporation. The resin, being heavier than the watery liquid now left, remains at the bottom of the dish. The fluid is now carefully poured off, and fresh water used till it comes away free from any sour or bitter taste. The resin is now dried either spontaneously or by the aid of heat ; and to expedite the drying, it is spread out occasionally in a thin layer on the side of the dish.

The resin is brown in mass, but of a fawn colour, in thin layers. Heated on platinum foil it melts into a liquid, takes fire, burns with a bright white flame, and disappears entirely. Two-thirds of a grain acts upon ourselves as a powerful narcotic, and one grain produces complete intoxication. In this character it is quite analegous to alcohol, but in its hypnotic and soothing effects on the nervous system, its resemblance to morphia is very great. It contracts the pupil. It does not seem to have any spasmodic or paralysing action upon the bladder.

One experiment of ours shows that the peculiar action of hemp resin on the human system is not easily destroyed, and is retained with great tenacity. We heated in the open air a dose of the resin, spread out so as to cover nearly two square inches of the bottom of an evaporating basin, at a temperature of 180° Fahr., for eight hours continuously, notwithstanding which treatment it appeared to us on trial not to have suffered the least diminution of its energy. The resin contains the whole power of the plant, which we have proved by taking a quantity of the plant equivalent to a dose of the resin. We could observe no difference in strength of action. The dried gunjah yields from 6 to 7 per cent. of the resin.—*Ibid.*

ART. XII—.ON QUINOIDINE.

By Mr. Redwood.

Since the publication of the fact that the amorphous quinine, for which a patent has been taken out in this country, is neither more nor less than the substance which has long been known in commerce under the name of *Quinoidine* or *Chinoidine*, numerous inquiries have been made as to the difference, if any, *in quality*, between the patented preparation, and the quinoidine in the state in which it is met with in commerce. Most of the wholesale houses are now supplying quinoidine at one-fourth the price of the patented amorphous quinine, and there can be no reason why the former should not in all cases be substituted for the latter, if it be found to be equal to it in quality.

It has been already shown that quinoidine and the patented amorphous quinine, are both mixed products, containing several proximate principles, and that one part of these principles is soluble, the other insoluble in ether. Even the part which is soluble in ether, is found, on examination, to consist of two or three bodies, which, to a certain extent, may be separated by crystallization. No method, however, has yet been pointed out by which the whole of these bodies may be readily and completely separated from each other; indeed, the task would be nearly as difficult as that of resolving a specimen of extract of bark into its proximate constituents.

But although quinoidine and the patented amorphous quinine have no more title than some of the medicinal extracts to be classed among definite chemical bodies, yet we may judge of the qualities of different specimens of these substances, by the examination of their physical and chemical characters.

Quinoidine, it is well known, is obtained from the dark

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coloured mother-liquor remaining after the crystallization of the disulphate of quinine. In the evaporation of this liquor, similar changes no doubt take place to those which occur in the preparation of extracts; and the quinoidine which is precipitated by the addition of an alkali, will be subject to variations, according to the greater or less degree of heat, and of atmospheric action to which the liquor has been exposed. Again, if, instead of adding an alkali to precipitate the quinoidine, the liquor be simply evaporated to dryness, the product, will, of course, be very different; it will now be more or less soluble in water, in consequence of the presence of the acid. Some specimens of quinoidine are said to have been obtained in this way.

Thus quinoidine is liable to variations in quality and in composition, arising from two distinct causes.

In examining specimens of quinoidine, with the view of estimating their qualities, the following method may be adopted:

The specimen should be dried by the heat of a water-bath, until it ceases to sustain any further loss of weight.

(a) A weighed quantity of it is to be dissolved in distilled water acidulated with sulphuric acid, and ammonia added to the solution as long as any precipitate is formed. This precipitate is to be collected on a filter, washed, dried by the heat of a water-bath, and then weighed. The two weighings should correspond, if the specimen be good.

(b) A portion of the dried specimen is to be treated with rectified spirit, in which it should be perfectly soluble. Those specimens, the solutions of which have the lightest colour, are most free from smell, and in taste approach to a pure bitter, may in these respects be considered the best.

(c) A weighed quantity of the dried specimen is to be treated with ether as long as anything is dissolved by this menstruum, the solution being promoted by trituration in a mortar; the ethereal solution is to be submitted to spontaneous evaporation in a large porcelain dish, and the in-

soluble residue dried by the heat of a water-bath, and weighed. The insoluble part should not amount to more than thirty per cent. of the dried specimen. After the residue of the ethereal solution has stood for several days, it should be examined under a microscope, when it will be found to contain two kinds of crystals, one small and acicular—the other larger, in rhombic prisms. The former of these is quinine, the latter cinchonine, the proportions of which vary in different specimens.

I have met with no specimens, at present offered for sale in the London market, in which the presence of foreign matter was indicated by the tests (a) and (b). On treating different specimens with ether, as described (c), considerable difference is indicated. Some specimens contain as much as thirty-five per cent. of insoluble matter, while from one specimen that I have examined, there was only twenty-five per cent. of residue.

There is a difference in the appearance of the insoluble residue obtained from different specimens; in some cases it is much darker coloured than in others. The specimen yielding twenty-five per cent. of residue, is the best that I have met with; when reduced to powder, it is of a light brown colour; it forms a solution in spirit, or in water with the addition of an acid, which is not so nauseous in taste, as similar solutions formed from some other specimens, not excepting the patented preparation. Moreover, the portion insoluble in ether, is of a much lighter colour than that obtained from the other specimens. This specimen appears to have been less exposed than the others to heat and other decomposing agencies.

I understand that some amorphous quinine, prepared according to Liebig's process, by solution in ether, has been made; but this will not, probably, be offered for sale, until the specification of the patent has been filed, when it will be known what the patentee's process is, and how far it will affect the manufacture and sale of Liebig's preparation by other parties.

There can be no doubt, however that *quinoidine* may
be made and sold as heretofore, without any reference to
the patent; and it will be a question for the profession to
consider, whether they will purchase it under its old and
well-known appellation, and at its fair market value, or
whether they prefer paying for the privilege of using it
under a new, assumed, but false title.—*Ibid.*

Note.—In our October number, an article on Amorphous Quinia
appeared from the pen of Baron Liebig, which exposed the fact that a
large portion of the Quinoidine or precipitated extract of Bark of
European commerce, was composed of the alkaloid Quinia in a pecu-
liar condition isomeric with ordinary quinia, and capable of forming
salts,—and is in fact the active agent in the black extract-like substance
officinal in our Pharmacopœia of 1830, under the name of " Impure
Sulphate of Quinia." Quinoidine is the matter precipitated when car-
bonate of potassa is added to the mother liquor that yields "impure
sulphate of quinia" by evaporation. The London pharmaceutists and
chemists have been thrown into a ferment, by the announcement that
a patent had been granted to J. Lloyd Bullock, for the exclusive pre-
paration of "Amorphous Quinia" on behalf of a foreigner;—and as
this announcement was not made until after the publication of Liebig's
paper, and the general currency of the facts contained in it, when the
manufacturers of sulphate of quinia had prepared themselves to furnish
the article, these gentlemen think themselves illy used. Liebig's
name is not used in the patent, but the editor of the Pharmaceutical
Journal and others suppose that he is the " foreigner abroad" for whom
the patent was obtained, which has called forth some severe animad-
versions. From the above paper by Mr. Redwood, the so-called
amorphous quinia is little more than the quinoidine of commerce, and
if so the patent can hardly stand. An extract from the patent follows.

                                                    W. P. Jr.

ART. XIII.—EXTRACT FROM A PATENT FOR PURIFIED QUI-
NOIDINE, AMORPHUS QUININE, AND BASIC EXTRACT OF
BARK.

[The first part of the specification granting the powers,
&c., is omitted.]

Preparation of Purified Quinoidine or Chinoidine.—I
take three pounds of the residue of quinine manufacture,
termed chinoidine (which should be soluble in alcohol and
in dilute sulphuric acid, and insoluble in water.) Nine
ounces by measure of concentrated sulphuric acid diluted
with one gallon of water, and dissolving the chinoidine
therein, I then pass sulphuretted hydrogen through the so-
lution for nine hours, for the purpose of precipitating metal-
lic matters and other impurities.   The mixture is then to be
filtered through paper or other suitable material, as is well
understood by chemists; it is then boiled to drive off excess
of sulphuretted hydrogen, and an alkali or alkaline carbo-
nate added, to precipitate the chinoidine.   I use commonly
for the above named quantity, three pounds of carbonate
of soda, dissolved in one gallon of distilled water.   The pre-
cipitate obtained is then to be well washed with distilled
water, and dried over a water-bath; towards the conclusion
of the drying, and in order to dry it more effectually, I
place it in a chloride of calcium bath, and heat it a few de-
grees higher than 212°.   It is then reduced to powder, and
kept in well-closed bottles. This purified chinoidine may
also be kept in solution in alcohol or other vehicle, or made
into saline compounds.   I prefer to sell it in a state of pow-
der, it being more convenient in that form.   I also prepare
various saline compounds of purified chinoidine, by taking
at the rate of one-twelfth less than of the amorphous quinine
hereafter explained, and mix it with acids as hereafter ex-
plained in respect to amorphous quinine. In some cases

it is desirable to dissolve the purified chinoidine in alcohol before mixing with the acids. These saline compounds I prepare for sale, either in solution or by evaporating them to the solid state, and reduce them when they will allow of it, to powder. In all cases, the preparation should be kept in well closed bottles.

The preparation of Amorphous Quinine.—I take three pounds of chinoidine as before, or in the purified state as above described (for this purpose it is best to use it before it is fully dried) and mix it well with twice its weight of pure sand, and digest in nine parts of ether (commonly known as sulphuric ether.) The specific gravity of the ether I believe most suitable, being about 735; I stir up the mixture three or four times during the digestion, which should continue twelve hours, and pour off the solution. To the residue I add nine pints of fresh ether, and proceed as before; I mix the two solutions, and allow them to settle; when perfectly bright, I pour off the fluid from the sediment into a retort or suitable vessel, and distil off the ether by means of a water-bath. The substance left in the vessel is to be dried in the same manner as is directed for the purified chinoidine. To this residue I apply the term *Amorphous Quinine.* The saline compounds are prepared by taking one equivalent of an acid in solution, and dissolving in it an equivalent of the amorphous quinine, considering carbon 6, oxygen 8, hydrogen 1. I take one hundred and sixty-two parts of amorphous quinine to each equivalent of acid, all which is understood by chemists, and I form basic neutral or acid salts, in the usual way.

Basic extract of Bark.—The residue left upon treating chinoidine with ether, in order to extract the amorphous quinine, contains also valuable medicinal matter. I take any given amount of this product, and calculating the amount of dry substance it contains, treat it with six times its weight of alcohol, generally preferring it 56° over-proof. I decant the clear fluid, and evaporate it to dryness, in the same manner as with amorphous quinine. To this product

I apply the designation *Basic Extract of Bark*, or I prepare this as follows:—To three pounds of the dry residue, as above, I add nine ounces by measure of concentrated sulphuric acid diluted with one gallon of water, and dissolve the same; and through this solution I pass sulphuretted hydrogen, and proceed in the same manner as when producing purified chinoidine, and in making solutions and saline compounds therefrom.

Having thus described the nature of the invention and the manner in which the same is to be performed, I would have it understood that I do not confine myself to the details herein described so long as the peculiar character of either part of the invention be retained; but what I claim is,

First, The manufacture of what I have called "Purified Chinoidine," by purifying and reducing that matter to a state of powder, as herein described; and I also claim the making alcoholic and other solutions of such purified chinoidine, and also the producing saline compounds thereof.

Secondly, I claim the manufacture of what I have called "Amorphous Quinine" by separating the matter soluble in ether from other matters, as herein described; I also claim the preparing alcoholic, ethereal, and other solutions thereof, and I also claim the preparation of saline compounds of the same.

And, thirdly, I claim the manufacture of what I have called "The Basic Extract of Bark," by separating such product by ether from the soluble matter, and preparing such extract as herein described, and producing alcoholic and other solutions and saline compounds thereof.

IN WITNESS WHEREOF, I, the said John Lloyd Bullock, have hereunto set my hand and seal this twelfth day of November, in the year of our Lord one thousand eight hundred and forty-six.

JOHN LLOYD BULLOCK.

Ib.

ART. XIV.—ANALYSIS OF ALOES AND ALOETINE.
By M. Edmond Robiquet.

THE specimen of the aloes examined, was obtained from M.
Chevallier; it was found to contain the following constituents
in 100 parts:

Pure aloes (*Aloëtine*)	85.00
Ulmate of potash	2.00
Sulphate of lime	2.00
Carbonate of potash . . . ⎫	
Carbonate of lime . . . . ⎬	traces.
Phosphate of lime . . . . ⎭	
Gallic acid	0.25
Albumen	8

To obtain the *aloëtine* or *purified aloes*, commercial aloes,
reduced to powder, was exhausted with cold distilled water,
by which means none of the salts present, excepting the ulmate
of potash, and a small quantity of sulphate of lime and carbo-
nate of potash, are taken up. This solution was evaporated
over a water-bath until reduced to one half, and an excess of
neutral acetate of lead was then added, which threw down a
light flocculent yellow precipitate, consisting of a mixture of
gallate, ulmate, and albuminate of lead, and containing traces
of carbonate and of sulphate of lead.

The solution now contained, in addition to the aloes, ace-
tate of potash, and acetate of lime, resulting from double de-
composition, and the excess of acetate of lead. On adding
a sufficient quantity of ammonia, the precipitated oxide of lead
carried down all the aloes contained in the liquor, forming a
kind of lake of a pure orange-yellow colour, passing in a few
minutes under the influence of the solar light, to a greenish-
yellow. This lake, quickly separated and washed with boil-
ing water, was decomposed by a current of sulphuretted hy-
drogen, atmospheric air being excluded. On the conclusion of

this operation, the sulphuret of lead was covered by a perfectly colourless supernatant liquor, which, on being carefully decanted and evaporated *in vacuo,* afforded no crystals, but dried in scales, having the appearance of a kind of varnish, with a very slight tint of yellow.

I used the product thus obtained in my examination for the presence of nitrogen, and also in the analysis with oxide o copper. To distinguish it from the crude aloes I have called it *aloëtine.*

Aloëtine is obtained in the form of nearly colourless scales, if in the process air be as much as possible excluded. It is very soluble in water and in alcohol, little soluble in ether, and completely insoluble in the fixed and essential oils. On calcination in close vessels, a shining voluminous residue is left, which entirely disappears on incineration in the air. The aloëtine is not coloured by either the *per* or *proto* salts of iron; and it gives no precipitate with acetate of lead; in other respects its reactions are similar to those of socotrine aloes.

If the aloëtine be dried in contact with air, the scales, instead of being colourless, will have an intense red colour, due to a slight absorption of oxygen. With the exception of the difference in colour, it undergoes no modification in its chemical properties, and probably analysis would hardly detect any difference between that altered by the contact of air, and that prepared *in vacuo.* The process may therefore be rendered much more easy by drying the product over a water-bath, or by exposure to the heat of the sun, when it is not desired to obtain the aloëtine in a state of absolute purity.

Aloëtine possesses in a high degree the purgative properties and bitter taste of ordinary aloes. For medicinal use eight parts of aloëtine are equivalent to ten parts of socotrine aloes and fifty parts of Cape aloes.—*Ib. from Jour. de Pharm.*

ART. XV.—ON THE SOLUBILITY OF SOME PRECIPITATES
WHICH OCCUR IN QUANTITATIVE ANALYSIS.

By R. Fresenius.

I. *Solubility of the Potassio-chloride of Platinum in
Alcohol.—No free Muriatic Acid présent.—a.* An excess of
perfectly pure recently precipitated potassio-chloride of pla-
tinum was digested with alcohol of 0.805 spec. grav. for 6
days, at a temperature of 59° to 68°, in a closed flask, with
frequent agitation.   72.5 grms. of the perfectly colourless
filtered solution, evaporated in a platinum dish, left 0.0060
grm. residue dried at 212°.   Accordingly 1 part potassio-
chloride of platinum dissolves in 12085 parts of alcohol of
0.805 spec. gravity.

b. The same experiment, made with spirit of 0.873, show-
ed that 1 part of the salt required 3775 parts spirit of this
strength for solution.

c. With spirit of 0.923, 1 part of the salt dissolved in
1053 parts.

In the presence of free Muriatic Acid.—Recently preci-
pitated potassio-chloride of platinum was digested in the
cold with spirit of 0.873 spec. grav., to which some muria-
tic acid had been added.   67 grms. of this solution, which
was coloured yellowish, left 0.0146 grms. platinum, corres-
ponding to 0.0365 grm. potassio-chloride of platinum; con-
sequently 1 part of the double salt dissolves in 1835 parts
of spirit, containing muriatic acid.

II. *Solubility of the Ammonio-chloride of Platinum in
Alcohol.—No free Muriatic Acid present.*—The author
found 1 part of this salt to require 26535 parts alcohol of
0.805 for solution, 1406 spirit of 0.873, and 665 parts spirit
of 0.228.

In the presence of Muriatic Acid.—1 part of the double
salt dissolved in 672 parts of acidified spirit of 0.873 spec.
grav.

III. *Solubility of the Carbonate of Baryta.*—1 part of the recently precipitated salt dissolves in 14137 parts *cold* water, and 1542 parts *boiling* water.

A solution of chemically pure chloride of barium was treated with an excess of ammonia and carbonate of ammonia, heated gently, and set aside for 12 hours. The filtered solution remained perfectly clear on the addition of sulphuric acid; after standing for a very long time a scarcely perceptible precipitate had separated. 84.82 grms. of the solution, evaporated in a small platinum dish and gently ignited, left 0.0006 residue; consequently 141000 parts of the liquid, containing ammonia and carbonate of ammonia, had dissolved 1 part of the salt.

IV. *Solubility of the Silico-fluoride of Barium.*—1 part of the salt was found to dissolve in 3802 parts *cold* water and 3392 parts water, after being boiled with it, and then allowed to cool. In cold water containing muriatic acid the relation is as 1 part to 733; but on being boiled and then allowed to cool, the relation is as 1 to 640.

V. *Solubility of Sulphate of Strontia.*—In pure water at the ordinary temperature 1 part dissolves in 6895, and in 9638 parts of water at 212°.

In water containing muriatic and sulphuric acid, 1 part requires 11862 parts.

VI. *Solubility of Carbonate of Strontia.*—1 part of the salt requires, according to the author, 18045 parts water for solution; and in water containing ammonia and carbonate of ammonia, 1 part requires 36545 parts for solution.

When a solution of chloride of strontium is precipitated with carbonate of ammonia and ammonia, the filtered solution is not rendered turbid on the addition of alcohol by sulphuric acid.

VII.—*Solubility of Carbonate of Lime in Water.*—1 part of this salt dissolves in 8834 parts *boiling* water, and in 10601 parts *cold* water; and in water containing ammonia and carbonate of ammonia 1 part in 65246 parts.

VIII. *Solubility of pure Magnesia in Water.**—Perfectly pure crystallized sulphate of magnesia was dissolved in water, the solution precipitated with carbonate and caustic ammonia, the precipitate most carefully washed (it still contained nevertheless a perceptible trace of sulphuric acid ;) it was dissolved in pure nitric acid, avoiding an excess of acid, again precipitated with carbonate and pure ammonia, and the precipitate most carefully edulcorated. The perfectly pure basic carbonate of magnesia thus obtained was ignited in the platinum crucible until its weight remained constant, then digested with distilled water (which left on evaporation not a trace of fixed residue, and was likewise perfectly free from chlorine) for 24 hours in the cold, being frequently agitated. 1 part of pure magnesia was found, on an average of three experiments, to dissolve in 55368 parts cold water. This solution of magnesia has a faint but distinctly alkaline reaction, which may easily be detected by means of slightly reddened litmus paper; it is not rendered turbid by alkaline carbonates either in the cold or on boiling; it likewise remains clear with phosphate of soda, but if ammonia be added it becomes turbid after slight agitation, and soon deposits a distinct precipitate of basic phosphate of ammonia and magnesia.

Pure magnesia, boiled with water, yields a solution which behaves in every respect like that prepared in the cold.

IX. *Solubility of the Carbonate of Lead.*—The author finds that 1 part requires 50551 parts of pure water at the ordinary temperature for solution; this solution is not in the slightest degree coloured by sulphuretted hydrogen.

In water which contained a little acetate of ammonia, and also carbonate and pure ammonia, 1 part of the salt dissolves 23450 parts; the solution was slightly coloured by

* The very different results formerly obtained are undoubtedly owing to an imperfectly pure magnesia having been employed in the experiments.

sulphuretted hydrogen, and after long standing deposited traces of sulphuret of lead.

Water, containing much nitrate of ammonia besides carbonated and caustic ammonia, dissolves, judging from the colour produced in the filtered solution by sulphuretted hydrogen, somewhat more of this salt than in the preceding experiment.

X. *Solubility of Oxalate of Lead.*—A dilute solution of acetate of lead was precipitated with oxalate of ammonia and ammonia; the liquid filtered from the precipitate after long standing exhibited, on the addition of sulphuretted hydrogen, a faint brownish tint when viewed from above.

XI. *Solubility of Sulphate of Lead.*—1 part of this salt requires 22816 parts of pure water at 52° for solution. In water containing sulphuric acid, 1 part of the salt requires 36504 parts; and in water containing ammoniacal salts and sulphuric acid, no perceptible colour is produced by the addition of sulphuretted hydrogen to the filtered solution.

XII. *Solubility of the Basic Carbonate of Zinc.*—1 part of the salt was found to require 44642 parts water for solution.

XIII. *Solubility of Chloride of Barium in Absolute Alcohol.*—1 part of the salt requires 8108 parts of cold alcohol of 0.795 spec. grav.; and on boiling and then allowing to cool, 1 part dissolves in 6685 parts; but when filtered boiling, 1 part was found to have dissolved in 4857 parts of the boiling alcohol.

XIV. *Solubility of Chloride of Strontium in Alcohol.*—1 part of the salt dissolves in 116.4 parts of cold alcohol of 0.795 spec. grav., and in 262 parts boiling alcohol.—*Chem. Gaz., from Liebig's Annalen.*

ART. XVI.—ON THE CHANGE WHICH TINCTURE OF IODINE UNDERGOES WITH KEEPING.

By M. GUIBOURT.

Extracted from the Bulletin de l' Academie de Medicine.

I wish to direct the attention of the Académie to the variations which the alcoholic tincture of iodine presents in its constitution and therapeutic effects, according to the length of time which has elapsed since its preparation.

I will commence by taking a retrospect of the use of iodine since Coindet proposed it as a remedy for goitre. The alcoholic tincture was at that time prescribed in doses of four, six, or eight drops two or three times a day, in some aqueous liquid. But the iodine is precipitated on adding the tincture to water, the solid particles of iodine being held in suspension in the liquid; and these being deposited on the coats of the stomach, caused active irritation, and probably small local ulcerations. Thus it was found that persons attacked with goitre, but who in other respects were in good health, after commencing the tincture of iodine, experienced pains in the stomach, loss of appetite, bad digestion, and wasting, which gave rise to the opinion, prevalent at that time, that iodine could not be used for reducing goitre, without its producing, at the same time, a general emaciation; that it diminished, in particular, the breasts; and that when prescribed for young females, it retarded the development of those organs designed for them by nature. Coindet, with the view of obviating these objections to the remedy, substituted for the alcoholic tincture, a solution of iodine in iodide of potassium, which giving no precipitation of iodine when added to water, acted as a mild and uniform stimulant to the stomach, and thus improved the digestive functions. Thus from that time, not only have all the objections which were previously urged against

the use of iodine ceased to exist, but on the other hand, it has been found, that weak and debilitated patients improved in appetite and condition, and young females acquired improved colour, increased developement of the breasts, and regularity of the natural economy, in proof of the beneficial action of the medicine.   I have taken a review of these circumstances, which must be in the recollection of most medical men, in order to establish the great difference which exists between the action of iodine when administered in the solid state, and in the state of perfect solution.   I now pass to the examination of the mixture employed by M. Velpeau in the treatment of hydrocele.

I will first consider the case of tincture of iodine recently prepared, such as that which I present to the Academy, which was made three days ago, according to the directions of the Codex, by dissolving, without heat, one part of iodine in twelve parts of spirit, sp. gr. .848.   If this tincture be mixed with twice its weight of water, the iodine will be almost entirely precipitated in the form of black particles, easily separating by repose, and the supernatant liquid will be almost colourless.   In what way should this liquid be taken?   If the clear and transparent part only be taken, it would probably produce only a slight stimulating effect, due principally to the spirit.   If, on the other hand, the liquid be shaken up before taking it, the solid particles of iodine would be deposited on the coats of the intestinal canal, and would produce a degree of irritation that may not be free from danger.

I will now consider the case of tincture of iodine which has been prepared four or five months.   The following is the change which has taken place during this interval of time.   One part of the iodine takes hydrogen from the alcohol to form hydriodic acid, which unites with another portion of iodine to form ioduretted hydriodic acid, which gives no precipitate with water.   On the other hand, the alcohol probably replaces the lost hydrogen by iodine, forming

another compound not precipitated by water. It is found, therefore, on mixing this tincture, four or five months old, with twice its weight of water, that there still is a precipitation of iodine, but that the precipitate is three or four times less in quantity than that afforded by the recently made tincture. The supernatant liquor, in this case, however, will be much more highly coloured than in the other, and it is unquestionable that the effect of the mixture, whether it be given clear or with the precipitate, would be different from those of a similar mixture made with the recently prepared tincture.

Lastly, if we take tincture of iodine that has been prepared for a year or a year and a half, it will scarcely cause any precipitation with water, and its medicinal effects will be different from those of the tincture in either of the cases previously considered.

I conclude from these facts, to which I have long had my attention directed, that the alcoholic tincture of iodine is a medicine liable to variations in its composition and in its effects, and that it ought to be replaced by a somewhat similar mixture, which should be made extemporaneously. Such, for example, as the following, in which the whole of the iodine would remain in solution, forming a homogenous mixture:

℞   Iodine, 5 parts.
     Iodide of potassium, 6 parts.
     Rectified spirit, 50 parts.
     Distilled water, 100 parts.

Triturate the iodine, iodide of potassium and part of the water in a mortar; then add the spirit, and the remainder of the water.—*Pharm. Jour., from Journ. de Pharm.*

ART. XVII.—ON ACHILLEÏNE AND ACHILLEÏC ACID.

By B. Zanon.

M. Zanon obtains the active principle of this plant,* which is used in the south of Europe as a substitute for sulphate of quinine in intermittent fevers, by boiling 2,000 grammes of the dried plant with 16 lbs. of rain water for about two hours. The residue is again boiled twice with smaller quantities of water, and the filtered solutions are mixed. These are then clarified with white of egg, and evaporated at a gentle heat until a whitish pellicle is formed on the surface. After twenty-four hours the cold liquid deposits a mass, consisting for the most part of vegetable fibre, green coloring substance, with some coagulated albumen, extractive matter insoluble in alcohol, lime salts, and traces of silica. The filtered bitter and acid liquid is treated with an excess of hydrate of lime, which produces a white precipitate; upon this the liquid is treated with acetate of lead as long as any precipitate is formed. This is collected on a filter, and the solution saturated with sulphuretted hydrogen, after which it still possesses a yellowish colour and a very bitter taste. On evaporation it yields nearly 150 grammes of dry extract, which, as well as the previously filtered sulphuret of lead, are exhausted with alcohol. The two, mixed and evaporated, yield 130 grammes extract, which the author calls achilleïne. As the author found that substance thus obtained still contained some acetate of lime, resin, &c., he modified the above process, and treated the neutralized decoction with animal charcoal, evaporated to dryness, and extracted with boiling absolute alcohol. In this way the formation of acetate of lime was avoided and time saved. Achilleïne can be freed from the slight trace of resin by solution in water. The colour of achilleïne is in-

* Achillea millifolium—Yarrow.

stantly destroyed by chlorine; it is not precipitated by tincture of galls nor acetate of lead, but it is thrown down by
basic acetate of lead ; it is soluble in ammonia, and the solution, when exposed to the air until the ammoniacal odour
has disappeared, deposits brown flakes, which are less soluble than achilleïne.   From all its properties it should undoubtedly be ranked with the bitter extractive substances.

To obtain the acid to which the decoction of the yarrow
owes its acid reaction, the author treated it with acetate of
lead as long as a precipitate resulted, and this was suspended
in water and decomposed with sulphuretted hydrogen. The
liquid obtained was very acid, and still contained some
green coloring substance and lime ; it was, therefore, supersaturated with carbonate of potassa (which precipitated the
lime) and then treated with animal charcoal.   The potassa-
salt was precipitated with acetate of lead, and the precipitate decomposed with sulphuretted hydrogen.

Achilleïc acid is not volatile at 212° F.; its solution can
therefore be concentrated by evaporation in the water-bath.
The greatest concentration to which it can be brought is
1.014825.   In this state it is perfectly colorless, but on further evaporation it becomes straw-colored. Exposed to the
air in a glass or porcelain dish, it crystallizes in perfectly
colorless quadrilateral prisms. The crystallised acid requires
at 56° F. two parts of cold water for solution ; the solution
is very acid, makes the teeth rough, has no odour, and
strongly reddens litmus paper Added by drops to a clear
solution of acetate of lead, it it does not render it in the
least turbid ; but in a solution of basic acetate of lead it
immediately produces a white precipitate, which is very
slightly soluble.

Achilleäte of potassa is obtained when the acid, diluted
with only a little water, is poured into a solution of carbonate of potassa, so as to neutralize it ; the liquid is then
filtered, evaporated, and set aside to crystallize. This salt
separates in very minute prisms, which can only be seen
with a microscope ; it has a saline taste, which resembles

that of chloride of sodium, it is less soluble in alcohol than in water; exposed to the air it is not altered, but its mother-ley acquires under the same conditions a yellowish tint.

Achilleäte of soda is prepared with carbonate of soda in the same manner as the potassa salt. The taste of this salt very much resembles that of the preceding, as also its solubility in water and alcohol, but its crystalline form is very distinct from that of the potassa salt; a clear concentrated aqueous solution yielded very beautiful rhombic crystals, which could be perceived with the naked eye.

Achilleäte of ammonia may be prepared by mixing achilleïc acid with ammonia; the liquid becomes pale yellow when evaporated to a syrup. By exposure to the air for several days it slowly evaporates to a saline mass, which has a similar taste to the potassa and soda salts. It is soluble in water and insoluble in pure alcohol.

Achilleäte of lime crystallises in irregular scales or needles: it is obtained when lime is treated for some hours with slightly diluted achilleïc acid, filtered and set apart to crystallize; it is insoluble in absolute alcohol.

Achilleäte of magnesia is difficult to obtain in the crystalline form: when its solution is allowed to evaporate in the air, a yellowish, solid, transparent, gummy mass, more soluble in water than in alcohol, is obtained. It is prepared in the same way as the salt of lime.

Achilleäte of quinine.—Quinine dissolves in slightly diluted achilleïc acid by allowing the substances to act for several days on each other, stirring them frequently until the liquid no longer reddens litmus-paper. Upon this it is filtered, and some alcohol added; it is heated nearly to boiling, and allowed to cool. Nearly the whole liquid is converted into very beautiful radiate-grouped prismatic crystals. The salt has a very bitter taste, and is readily soluble in water and alcohol. On account of its great solu-bility, the author considers that it will be found better adapted than sulphate of quinine for medical purposes.— *Chemist, from Liebig's Annalin.*

ART. XVIII.—EFFECT OF MATICO-LEAF IN A CASE OF
OBSTINATE HÆMORRHAGE.

THE patient was a boy between four and five years old,
who, in falling had bit his tongue, the consequence of
which was an oozing of blood which, when the child was
brought to Mr. Hamilton, had continued for two days, to
the great alarm of his family, as his brother had died from
hæmorrhage occasioned by a slight injury of the nose, and
the boy himself had before nearly bled to death from some
slight wound about the mouth. Actual cautery first, and
then a ligature, applied by means of a sewing needle, had
each but a temporary effect, and finally the hæmorrhage
was stopped by persuading the child to keep sucking a
piece of alum for an hour or two. It was long before the
child recovered his strength.

The child was brought a second time to Mr. Hamilton,
having again bit his tongue three days before, during which
time a continual oozing of blood had gone on, causing a
perfectly blanched appearance, notwithstanding that nitrate
of silver had been applied, and a piece of alum had been
sucked as before. After in vain trying pressure, Mr.
Hamilton took a piece of matico-leaf (Piper angustifolium)
and applied the lower surface to the bleeding point, and
retaining it there as long as the child would keep the tongue
quiet, which was not half a minute. He then found that
the blood had ceased to flow, and that the small spangle of
matico-leaf adhered to the tongue. It fell off in half an
hour, when there was scarcely any appearance of bleeding;
a second piece was applied, and the hæmorrhage completely
stopped.—*Ibid, from Dublin Hospital Gazette.*

ART. XIX.—THE TANNATE OF IRON IN THE TREATMENT OF CHLOROSIS.

By BENEDETTI.

THIS substance, according to our author, excels all other medicines in the treatment of chlorosis. In evidence of this he cites cases from his own, and from the practice of Majocchi, affirming that the treatment by the tannate of iron is successful in from twelve to twenty-five days, according to the severity of the case. It is to be administered in doses of from eight to thirty grains in the day. It acts more rapidly in persons of sanguine temperament. The mode of preparation, as described by M. V. Gaddi, is as follows :—A very pure sulphate of iron is made by the action of dilute sulphuric acid on iron filings; from this sulphate, by means of carbonate of soda, a carbonate of iron is precipitated, which is washed several times, and then dried on the stove. It is now pulverized and thrown by small portions at a time into a boiling solution of very pure tannic acid in a porcelain vessel—the proportions used being very nearly five parts of the carbonate to one of the acid—or 440 parts of the carbonate to 90 of the tannic acid. The fluid is to be stirred constantly till the effervescence ceases. It is afterwards exposed to a heat equal to the boiling point of water, till it acquires the consistence of thick soup. It is then withdrawn from the fire and poured on porcelain plates, and dried with the assistance of heat. The tannate of iron thus obtained is of a crimson color, insipid, insoluble, uncrystallized, though before being dried it appears in long needles. It may be administered either suspended in syrup, or still more conveniently in the form of pills.

ART. XX.—ALTERATION EXPERIENCED BY THE HYDRATED OXIDE OF IRON UNDER WATER.

By Dr. G. C. Wittstein.

A solution of sulphate or hydrochlorate of iron yields with ammonia a very voluminous flushy brownish-red precipitate of $Fe^2O^3 + 3HO$, easily soluble in cold acetic acid. These facts are well known; but it is scarcely, if at all, known that a similar precipitate, which has been allowed to remain some time under water, and, consequently, which has never been dried, loses entirely, or in great measure, its power of solution in acetic acid, just as though it had been dried. Other organic acids, moreover, which, under ordinary circumstances, dissolve undried oxide of iron with great facility, as, for example, tartaric and citric acids, take up a much less quantity of oxide thus prepared. I have already remarked in this journal, vol. 92, sec. 290, the circumstance alluded to, having found that in the preparation of citrate of oxide of iron the freshly prepared oxide was necessary to the effect. Since that period I have investigated the cause of this peculiar behaviour, and with a fortunate result.

If a portion of the precipitate recently thrown down be washed, and then examined microscopically, no trace of crystalline structure, properly so called, is observable, the particles consisting merely of little amorphous bodies. If, however, a portion of the oxide which has been allowed to remain under water be examined, it is found to be crystalline throughout. The little crystals are of a dark yellow colour, and moderately transparent. How long a period of aqueous submersion is necessary to effect this crystalline change I am unable to say—my crystalline deposit, which I microscopically examined, was more than two years old; it is, however, exceedingly probable that the peculiar change

alluded to occurs much sooner, because I remember that a portion of oxide which had been allowed to remain half a year under water, presented an alteration of external appearance, having become more compact.

Not only does this alteration of microscopic structure take place amongst the particles, but the more insoluble compound only contains half the original quantity of water, its formula being $2Fe^2O^3 + 3HO$. Consequently the diminished solubility of the altered oxide depends on two causes—its altered constitution in regard to water of combination, and its altered microscopic condition.

Perhaps it is not an indifferent matter whether as an antidote for arsenious acid the hydrated oxide have been long standing under water or the contrary; at any rate, of two preparations of this oxide the more recent should have the preference; and it would be prudent to recommend that the store of hydrated oxide should be renewed every half year. The old preparation having given place to the new should not be thrown away, but redissolved in hydrochloric acid, and again precipitated by ammonia, when its original properties are renewed.—*Chemist, from Buchner's Repertorium.*

NOTE.—The reader is referred to page 29, vol. 14th of this Journal. In the article referred, to the results obtained now by Dr. Wittstein were then arrived at, and under similar circumstances. The summary of that paper says—" That hydrated peroxide of iron, even when kept under water, gradually decreases in its power of neutralizing arsenious acid," and "that this decrease in power is probably due to a change in the relative *proportion of the oxide, and the water chemically combined with it,* as well as to an *alteration in its state of aggregation.*" The microscopic observation of Dr. Wittstein in reference to this change is corroborative of that statement.   W. P., JR.

ART. XXI.—ON A NEW PREPARATION OF IODINE.—SYRUP OF IODIDE AND CHLORIDE OF IRON.

By Samuel Battley.

As iodine is at present so extensively employed, and maintains so high a character as a remedial agent, it appears rather singular that some of its most efficient combinations are still so little used. Amongst these the iodide of iron is one which has not yet attained that rank in professional estimation that its merits claim. This seems in part owing to the process by which the London Pharmacopœia directs it to be prepared, its great tendency to decomposition, and the difficulty of its preservation. The iron possesses a greater affinity for the oxygen of the atmosphere than for iodine, in consequence of which the latter is set free, and when the preparation is exhibited in such a state, the stomach is frequently incapable of bearing what might otherwise prove a valuable tonic. This tendency to oxidation in the iron, and liberation of free iodine, is indeed prevented by using the syrup, the sugar in which has the property of preventing protoxides, protiodides, and protochlorides, from absorbing oxygen, and passing into peroxide, in which state iron exerts but little action on the system.

Practical men, however, have remarked, that the iodide of iron, even when given in the best form, has sometimes failed to produce that speedy and decisive chalybeate influence on the system that other salts do, though in other respects an agreeable and elegant form. This observation is readily explained on reference to the constitution of the salt, in which the amount of iron is less than one-fourth of that of the iodine, the combining proportion of the former being 28, while that of the latter is 126. As iodine is incapable of entering into combination with a greater proportion of iron, in order to increase the quantity we may sub-

stitute another salt of iron, isomorphous in its crystal, and analogous in constitution to the protochloride. These two salts may be mixed in any proportion without decomposition, and thus present an elegant and powerful preparation of iron, while the iodine, by its action on the glandular system and secretory apparatus, tends to prevent that cerebral plethora which the salts of iron, when given *per se,* so frequently induce.

The syrup of the iodide and chloride of iron, which it is the object of the preceding remarks to introduce to the notice of the profession, is prepared by first forming a solution of iodide of iron. This is effected by diffusing iodine in three or four times its weight of cold distilled water, and agitating for ten minutes with half the quantity of iron filings, added cautiously and gradually, when the colour changes from dark purple to a deep green, as combination takes place. The protochloride of iron is next formed, by acting upon iron filings with hydrochloric acid, specific gravity, 1.160. A copious disengagement of hydrogen gas ensues, and continues for several hours, during which the chlorine combines with one equivalent of iron, the fluid becomes neutral to test paper, and we obtain a solution of a green colour, also with a shade of blue. The two solutions are now mixed together, and so much refined sugar added as will form a syrup.

The syrup ought to be of a pale green, representing the protosalts of iron. The proportion of the salts in solution are so adjusted, that each fluid drachm of the syrup contains three grains of combined iodine and nearly four grains of iron, united partly with the iodine and partly with the chlorine. The following formula may afford an eligible mode of exhibition :—Syrup of iodide and chloride of iron, two drachms ; syrup of orange-peel, four drachms ; infusion of cascarilla, four ounces. Mix for four draughts, one to be taken twice daily.

6*

The syrup of iodide of iron, and syrup of chloride of iron, may be made and kept separately, when they can be mixed in any proportion, according to the amount of iron or iodine the practioner may wish to administer.—*Chem. from Lan.*

NOTE.—The author has not been sufficiently explicit. The following formula may be used by those desirous of making the preparation :

R   Iodine,   -   -   -   -   384 grains, Troy
    Hydrochloric acid, sp. gr. 1.16   4¼ ounces,   "
    Sugar, in powder,   -   -   12   "   "
    Iron filings
    Water, of each a sufficient quantity.

Mix the Hydrochloric acid with an ounce and a half of iron filings, free from oxide, and allow it to stand, with occasional agitation, until the acid is neutrallized, then filter. Next mix the iodine with three ounces of water in a flask, add half its weight of iron filings, agitate until all the iodine is combined, and filter also. Finally, mix the two solutions, add the sugar, and as much water as will make the whole measure a pint. The pure sugar is readily dissolved by agitation without heat.

The resulting syrup contains 29 grs. of protodide and 72 grs. of protochloride of iron in each fluid ounce, and each fluid dram 3 grs. of iodine and 4 of iron.   W. P., JR.

ART. XXII.—ON THE EFFICACY OF PYRO-ACETIC SPIRIT IN
GOUT AND RHEUMATISM.

BY JOHN HASTINGS, M. D.

IT is nearly four years since I called the attention of the profession to the remedial powers of pyro-acetic spirit, or medicinal naptha, in phthisis. It occasioned a great deal of discussion at that period, and many who questioned its value then have since acknowledged the truth of my views; and I believe many more would have done so, but unfortu-

nately the symptoms of early phthisis are not sufficiently precise to satisfy the minds of those disposed to be sceptical. The opinions I then advanced, I have had frequent opportunities of confirming.

However, it is gratifying to perceive that it is attracting attention on the other side of the channel; and I also find that a book has been recently published by Renshaw, written by an M. R. C. S., on the treatment of this disease, in which pyro-acetic spirit is put forth as the great curative agent; but this is without a single mention of my name in its pages.

I have now to deal with another class of diseases, about the diagnosis of which there is no room for either cavil or doubt: I mean, gout, acute and chronic rheumatism. For upwards of twelve months I have employed pyro-acetic spirit in these affections, and my treatment has been attended with a success quite extraordinary, far exceeding the results usually obtained by colchicum, &c. I have not yet seen a case of gout or acute rheumatism which has not rapidly disappeared under its use, at the same time that it brings about a very improved condition of the general health. Chronic rheumatism requires a more lengthened treatment for its removal; indeed, it has less power over this affection than the two preceding.

I should have forwarded a report of cases, with further observations on this treatment, but from my conviction of it value, I thought it better to make this general statement, and also to assert my claim to having been the first to employ this agent in a class of diseases hitherto so intractible, and defer the other for a future occasion.—*Chemist, from Lancet.*

ART. XXIII.—OBSERVATIONS ON NICOTINE, WITH A DESCRIP-
TION OF A METHOD FOR DETERMINING ITS AMOUNT IN
LEAF AND MANUFACTURED TOBACCO.

By M. Schloessing.

The following is the most advantageous method for pre-
paring nicotine. Tobacco is treated with water, and the
solution concentrated; the extract is dissolved in alcohol,
which after decantation is likewise concentrated; this last
extract is now treated with potash, then agitated with æther,
which dissolves the nicotine and also some foreign substances,
which are got rid of by precipitating the alkaloid in the
state of oxalate.   This precipitate is washed by agitating it
with æther, then treated with potash, again dissolved in
æther, and submitted to distillation.   The residue of the
distillation is coloured but limpid, and contains, besides
nicotine, water, æther and ammonia; a temperature of 284°
maintained for 12 hours, and assisted by a current of dry
hydrogen, suffices to expel these three bodies, so that the
nicotine passes pure and colourless, when the temperature
is subsequently raised to 356°.   2 lbs. of good tobacco,
grown in the department of Lot, is capable of yielding by
this process from 50 to 60 grms. of nicotine.

The formula for nicotine, $C^{20} H^{14} N^2$, proposed by M.
Melsens, is confirmed by my analyses; its equivalent,
1012.5, appears however to require doubling, for an equiva-
lent of sulphuric acid neutralizes twice 1012.5; and nicotine
is a powerful base, which precipitates the oxides of man-
ganese, iron, and silver; it is therefore not very probable
that its sulphate, which is neutral towards litmus paper, is
in reality a subsulphate.   The above view is also confirm-
ed by the following fact:—If some nicotine is placed in a

solution of a salt of lime or baryta, and an excess of carbo-
nic acid passed into the solution, 1 equiv. of carbonate of
lime or baryta is precipitated for every 2025 of nicotine.

Nicotine must exist in the tobacco in the state of a salt;
for the aqueous, alcoholic and æthereal solutions of this
plant behave precisely as if they contained a salt of nico-
tine.   Nicotine absorbs moisture from the atmosphere, but
it may be completely deprived of water, æther, and ammo-
nia by placing it over mercury in a bell glass full of hydro-
gen, by the side of a capsule containing concentrated sulphu-
ric acid.

The amount of nicotine in leaf or manufactured tobacco
may be accurately ascertained by a simple and easy pro-
cess.   10 grms. of tobacco are exhausted with ammoniacal
æther in a continuous distillatory apparatus, the ammonia-
cal gas expelled from the nicotine solution by boiling, then
decanted, and, after evaporation of the æther, neutralized
with a solution of sulphuric acid of known strength.   This
process will be applicable, with some slight modifications,
to most of the organic alkalies.   Its accuracy was proved
by ascertaining,—1st, that the displacement of the nicotine
by ammonia and the exhaustion by the æther are perfect;
2d, that merely boiling the solution of nicotine suffices to
expel the ammoniacal gas dissolved; 3rd, that during this
boiling no nicotine is lost; 4th, that a proportionality is
found between different weights of nicotine, and the quan-
tities of normal liquid required for their neutralization; 5th,
that there is no other substance besides the nicotine capa-
ble of absorbing the acid; 6th, that if the tobacco contained
any other bases than nicotine, they would not interfere;
lastly, nearly the whole of the nicotine contained in 10
grms. of Lot tobacco was extracted, purified, weighed and
analysed; the weight was 0.766, and should have been, ac-
cording to the test with the normal solution, 0.796.

The following amounts of nicotine were indicated by

testing in this manner various French and American tobaccos:

Lot,	7.96 per cent of the dried tobacco.
Lot et Garonne,	7.34 " " "
Nord,	6.58 " " "
Ile et Vilaine,	6.29 " " "
Pas de Calais,	4.94 " " "
Alsatia,	3.21 " " "
Virginia,	6.87 " " "
Kentucky,	6.09 " " "
Maryland,	2.29 " " "
Havanna, less than	2.00 " " "

It will be seen from this table that those tobaccos which contain the most nicotine are also the best suited for the manufacture of snuff.

The above method of determining the amount of nicotine applied to snuff indicated as a mean 2.04 nicotine per cent. of the dried powder; whence it is concluded that about two-thirds of the nicotine contained in the mixed leaves destined for the manufacture of snuff is destroyed by the fermentation. The ammonia exists in the snuff in the state of a salt; the nicotine, partly in a free state, and partly as a neutral salt, or altogether in the state of a subsalt. It is to these two salts that snuff owes its property of exciting the mucous membrane of the nose.

This memoir is the first part of an investigation on the composition of tobacco leaves and on the fermentation of tobacco, begun in the laboratory of the *Manufacture des Tabacs,* under the direction of Mr. Fremy.—*Chem. Gaz., from Comptes Rendus.*

ART. XXIV.—RELATION BETWEEN NITRIFICATION AND
THE FERTILIZATION OF SOILS.

By F. Kuhlmann.

ANIMAL substances exert their salutary influence upon
vegetation only when by their decomposition there is
a development of carbonate of ammonia. I have adopted
the same view for the nitrates employed as manures; I
have generally regarded their influence to be effectual only
when, by the deoxidizing action of putrid fermentation, their
acid is converted into ammonia. To show that this con-
version was probable, I was led to examine whether, in
operating upon liquid products, it would be possible to ob-
tain results analogous to those arrived at in 1838, with the
aid of spongy platinum, in acting upon mixtures of gases or
vapours. In the same year I showed that the production
of ammonia, by the action of weak nitric acid upon tin, was
not an isolated fact, but that it resulted from the action of
this acid upon all the metals capable of decomposing water,
and consequently the ordinary result of the contact of nas-
cent hydrogen with nitric acid. MM. Fordos and Gelis
have confirmed the correctness of my results, to which they
have added several other facts, especially that of the de-
composition of sulphurous acid by the action of nascent hy-
drogen.

The following are the results of some further experiments
in support of the conversion of the nitrates into ammoniacal
salts. When some fragments of nitre are thrown into a
mixture of zinc or iron and sulphuric acid, or, what is pre-
ferable, weak hydrochloric acid, the disengagement of hy-
drogen is stopped or retarded until the whole of the nitric
acid of the nitrate is converted into ammonia.

Nascent sulphuretted hydrogen occasions a similar con-
version, at the same time depositing sulphur.

When a nitrate, the metal of which is precipitated by zinc, nitrate of copper for instance, is placed in presence of a mixture of zinc and hydrochloric acid, for every equivalent of zinc dissolved there is one equiv. of copper precipitated, and one equiv. of the nitric acid of the nitrate is converted into one equiv. of ammonia, the whole without any liberation of hydrogen.

By passing a current of sulphuretted hydrogen through a solution of chloride of antimony mixed with a nitrate, the acid of this latter is converted into ammonia. Similar metamorphoses are effected by the contact of nitrates with a solution of sulphuret of arsenic in potash, or with the hydrated protoxides of tin and iron.

I think that, after the announcement of these facts, no doubt can remain relative to the decomposition which the nitrates experience in the soil under the influence of putrid fermentation. It is known that this fermentation, considered as a deoxidizing agent, is capable of overcoming the strongest affinities.

If the fertilizing agent must be presented to the plant principally, if not exclusively, in the state of carbonate of ammonia, serious inconveniences arise from the volatile nature of this salt: for it is no sooner confided to the soil to fertilize it, than a large portion is removed by the air to be diffused over the earth.

We have now to examine what influence nitrification has upon vegetation. It is conceivable that the mode of fertilization by the ammonia of the atmosphere may suffice for certain countries, and not for others; the more we approach the meridional countries, the less necessity is there for manures.

If I entertain the conviction that the nitrates do not act generally as fertilizers, except after having experienced, at a certain depth in the soil, a decomposition which yields carbonate of ammonia, I am not the less satisfied that the fertility of the soils likewise depends on an inverse reaction,

which is opposed to the volatilization of the ammonia; I mean the conversion of ammoniacal salts into nitrates, which occurs in the superficial portions of those soils which present a suitable chemical composition, and are placed under the most favourable conditions of moisture and temperature.

With respect to the conversion of ammonia into nitric acid, I proved satisfactorily in 1838 that this furnishes the most simple and conclusive explanation of the formation of the nitre beds. My opinions on this subject are at present admitted by the majority of chemists; but if any doubt should still exist, the following results will suffice to remove them. When a mixture of bichromate of potash, concentrated sulphuric acid and sulphate of ammonia is heated in a retort, a large quantity of nitric acid distils over. On heating a mixture of peroxide of manganese or peroxide of lead or minium and weak sulphuric acid in the presence of sulphate of ammonia, the ammonia of the sulphate is equally converted into nitric acid, which passes over.

In investigating the conversion of ammoniacal gas into nitric acid by its contact at a high temperature with the peroxide of manganese, I found that we possessed in this oxide a valuable agent for transferring *indefinitely* the oxygen of the atmosphere to the ammonia. MnO^2 by a first oxidation passes into the state of MnO, which the contact of air immediately converts into $Mn^3 O^4$, which is again susceptible of oxidizing the ammonia.

If we now compare the slow progress of nitrification in the northern provinces with the rapidity with which it results in meridional countries, it will be conceived how much greater the expense in ammonia or in nitrogenous manures must be in the north than in the south.

The Academy will probably attach some interest to the result of the experiments I have made in support of my opinion respecting the influence of nitrification upon the

fertilization of soils; it will perhaps also recognise that the facility with which I have succeeded in converting ammonia into nitric acid will serve, in case of any future continental blockade, to render Europe more independent of India and Chili in regard to its supplies of nitrates or nitric acid; that, under other circumstances, by an inverse reaction, we shall find in the nitrates of India and Chili abundant sources of ammonia, turning to advantage the hydrogen, and especially the sulphuretted hydrogen, which at present is lost in many operations of the arts, and moreover proves of considerable injury to the public health.

In conclusion, I may mention that the various reactions, the results of which are noticed in this article, have led me to the two following applications:—1st, I have based a new process for determining the amount of nitric acid and for the analysis of the nitrates, upon the property of these bodies of being entirely converted into ammonia or into ammoniacal salts under the influence of nascent hydrogen; 2d, by submitting to the action of nascent hydrogen various binary or saline combinations of metals, I have completely reduced a large number of these insoluble or sparingly soluble compounds in weak acids.

By operating upon native crystalline compounds, such as zigueline, azurite, malachite, carbonate of lead, oxide of tin, &c., the metal obtained preserves the crystalline form of the combination in which it existed.—*Ibid, from Comptes Rendus.*

MISCELLANY.

Some Experiments on Assafœtida. By H. REINSCH.—An ounce of finely pulverized assafœtida was mixed with an equal weight of hydrate of lime, and then stirred into a thin paste with a sufficient quantity of water. On submitting this to distillation, a colourless oil passed over with the water, and at the same time some ammonia was disengaged. The oil possessed a burning taste, and an odour differing from that of assafœtida. The residue in the retort was collected on a filter, and washed with hot water until this passed through colourless. A portion of the filtered solution was supersaturated with dilute sulphuric acid, when some brown flakes separated, which united on warming to brown drops, while upon the surface of the liquid some oil collected. On distilling this mixture, some traces of sulphuretted hydrogen, a slightly acid water, and some drops of oil passed over. Neither valerianic nor angelicic acid could be detected in it. The residue left in the retort was brittle, dissolved readily in ammonia, æther and alcohol, from which it separated as a grayish powder. The alcoholic solution of the resin has a faintly acid reaction. When heated on platinum it melts, and then burns with a bright flame; heated in a glass tube, it disengages white vapours, and subsequently drops of a green oil; at the same time the odour of horse-radish is perceptible. Concentrated sulphuric acid dissolves it with a brown colour, from which it is precipitated by water. Precipitated from the lime solution by muriatic acid, the resin forms a greenish powder, which does not cohere, but in its other properties it agrees with that precipitated with sulphuric acid. When the lime residue with which the assafœtida has been treated is exhausted with spirit, a yellow tincture is obtained, which has the taste of assafœtida, but is not bitter like the above resin. If the tincture be mixed with an acid, a resin separates, which possesses the peculiar odour of assafœtida.—*Chem. Gaz. from Jahrb. fur Prakt. Pharm.*

Observations on Glycerine. By F. ROCHLEDER.—The fats are, as is well known, decomposed by the action of strong bases or acids into a fatty acid and glycerine. The following is a new method of preparing

glycerine :—When castor oil is dissolved in absolute alcohol, and a current of dry muriatic gas passed through the warm liquid, the fat is decomposed. If, when the muriatic acid gas has acted sufficiently long, the liquid be shaken with water, an emulsion is obtained, which soon separates into an oily supernatant, and into a strong acid aqueous layer. The latter was separated from the layer of oil by means of a siphon, and evaporated in a platinum dish in the water-bath. At first a large quantity of muriatic acid passes off, and there finally remains a yellow syrupy mass. When this is treated with æther, a portion dissolves, while the remainder is not acted upon by the æther. After the evaporation of the æther an oily substance remains, which consists of the combinations of the fatty acids of the castor oil with oxide of ethyle ; the substance insoluble in æther forms, after drying *in vacuo*, a slightly yellowish syrup, which has all the properties of glycerine. The oxide of glyceryle of the fats contained in the castor oil has consequently been replaced by oxide of ethyle, while it has combined with the water which the alcohol parted with on its conversion into æther.—*Ibid, from Liebig's Annalen.*

Mode of ascertaining whether Olive Oil has been sophisticated with Rape or Poppy Oil. By M. DIESEL.—Pure olive oil is coloured green by ordinary nitric acid. On the other hand, 1 drm. of olive oil, sophisticated with rape oil and mixed with 12 drops of nitric acid, exhibited a strong yellowish-gray colour. Comparative experiments with various mixtures of oil showed that this reaction was still perceptible even with the addition of one-tenth. The adulteration with poppy oil is likewise easily detected with nitric acid, but the mixture then becomes yellowish-white, and not brownish as in the previous case. Pure nitric acid exhibits the reaction in a far less degree. Dr. Bley adds, that the samples must be judged of in the course of 12 hours after the addition of the nitric acid, as pure olive oil is likewise coloured more or less brown after a longer interval.—*Ibid, from Archiv. der Pharm.*

Test for Strychnia. By MACK.—Marchand has shown in the *Journal de Pharmacie et de Chimie* (1843, Sept., p. 200) that when strychnia is rubbed with peroxide of lead and sulphuric acid containing some nitric acid, it is immediately oxidized and a blue pigment formed, which becomes violet, then gradually red, and, after a few hours, yellow. This test is so delicate that $\frac{1}{1000}$ th of a grain of strychnia can be discovered by it. But as peroxide of lead is not usually found in chemists' shops, Mack substituted peroxide of manganese, and obtained similar results. With this test strychnia can be detected in

powdered nux vomica. If diluted nitric acid be applied to the powder or to strychnia, and to these be added some finely powdered oxide of manganese and afterwards a few drops of oil of vitriol, a dark-blue colour is instantaneously produced; but it soon changes to violet, then to pink, and at last to yellow. On heating the mixture the phenomena occur much more rapidly. With brucia, morphia, narcotina, and quina no change was produced; and with strychnia, the blue, violet, and red colours could not be produced when chlorate of potash was substituted for peroxide of manganese; because, probably, the chlorine effects other changes in the organic matter, not oxidizing, but rather dehydrogenizing it.—*Pharm. Jour. from Buchner's Repertorium.*

Test for Strychnine.—Instead of the brown peroxide of lead, Prof. Otto recommends a *very minute* quantity of a solution of chromate of potash. This immediately produces, when added to the solution of the strychnine in concentrated sulphuric acid, the splendid violet colour, which is far more distinct and beautiful than on the addition of the brown peroxide of lead.—*Chem. Gaz.*

On the formation of Lactic Acid. By H. WACKENRODER.—The author had previously announced that he had succeeded in converting sugar of milk into lactic acid by means of vegetable albumen; he returns to the subject in the present notice, in which he also describes the use of animal albumen for the same purpose. The conversion of milk sugar by other proteine compounds than caseine is interesting in many respects; but this question would acquire far more importance were it to change into certainty the presumption that every kind of sugar is susceptible of being converted in the same manner into lactic acid, and that this acid is generated whenever the alcoholic fermentation of the sugar or the conversion of the gum, principally of the dextrine, has failed. The author thinks that the free acid of beer, which is generally considered to be malic acid, is lactic acid; and according to the researches in which he is at present engaged, this acid not only occurs in the beers which have done fermenting, but the fresh wash, and even the malt itself, contains a certain quantity.

To ascertain the action of vegetable albumen on milk sugar, the juice of several plants separated from the chlorophylle was placed in contact for several weeks with milk sugar, and some powdered carbonate of lime, at a temperature of about 68° F., stirring it frequently. In all these experiments lactate of lime was obtained, which was very easily purified.

The resemblance of animal albumen to vegetable albumen induced the author to employ also the former, in order to effect the metamor-

phosis of the milk sugar; he first took the white of a fresh egg, dissolved it in distilled water, and followed the process described above, but the sugar underwent no alteration. He then placed the coagulated white of egg for some weeks in contact with water, and when it had become acid he added to it some milk sugar and carbonate of lime. After standing for six weeks in a warm chamber, the greater portion of the milk sugar had changed into lactic acid, and very beautiful groups of crystals of lactate of lime were obtained from it. M. Wackenroder concludes from these experiments that the albumen of the white of egg is not able to convert the milk sugar into lactic acid until after its coagulation and passage into acid fermentation; and that the negative result, obtained with the fresh white of egg, should probably be attributed to its alkalinity.— *Chem. Gaz., from Archiv. der Pharm.*

On the Composition of Sugar of Gelatine. By A. LAURENT.—The author has examined some sugar of gelatine in very beautiful crystals, and found 32.10 per cent. C, 6.66 H, 18.92 N, whence he deduces the formula $C^4 H^5 NO^4$; this gives $C = 32.0$, $= H\ 6.66$, $N = 18.66$, $O = 42.68$. According to this, sugar of gelatine would be isomeric with urethylane. When 1 equiv. water is added to hippuric acid, we obtain $C^{18}H^9\ NO^6 + HO = C^{14}H^6\ O^4 + C^4\ H^5\ NO^4$.—*Ib. from Comptes Rendus.*

On the Composition of the Oil of Ben.—By P. WALTER.—The oil of ben does not yield, on saponification, any volatile fat acid, but four fixed fat acids; viz. stearic, margaric, and two new acids, which the author calls *benic* and *moringic* acids.

The benic acid occurs in very small quantity in the oil of ben; it consists of $C^{30}H^{30}O^4$, and consequently belongs to the homologous series RO^4, being situated between myristic and ethalic acids. It crystallizes from its alcoholic solution in very voluminous tufts, and fuses at 126°—127°. Benic æther is very soluble in alcohol, and is deposited from the solution as a crystalline mass, but not in distinct crystals; it melts at a very low temperature, even by the heat of the hand, and contains $C^{34}H^{34}\ O^4$; it is isomeric therefore with margaric acid.

The other new acid, obtained by the saponification of the oil of ben, has been called moringic acid, from the name of the plant (*Moringa aptera*) which yields the oil. It is liquid, colourless or somewhat yellowish, and contains $C^{30}H^{28}O^4$, that is to say, 2 equivs. of hydrogen less than benic acid. From its composition it appears to be homologous to oleic acid. It would be interesting to ascertain whether, like the last, it would be decomposed under the influence of fusing potash

into two acids of another homologous series. Its density is 0.908, its taste insipid and irritating, its smell faint; it reddens litmus paper, and is very soluble in ordinary spirit even in the cold. It solidifies at 32° F. It is decomposed by sulphuric acid on the application of heat.

M. Walter has verified the composition of this new acid by an analysis of the æthers it yields with alcohol and wood spirit.—*Ib.*, *from Comptes Rendus.*

Experiments on the Absorption of Arsenic by Plants. By Dr. HERBERGER.—The experiments were made in the summer of 1843 in a loamy and in a sandy soil containing very little humus, with seeds of *Triticum spelta* which had been steeped in white arsenic. Although all the parts were examined both before the formation of stem, before flowering, and also just before ripening, not a trace of arsenic could be detected. In each experiment at least 250 grms. of the substance were carbonized with sulphuric acid, and then immediately tested according to Marsh's process, as well as by the method of Reinsch.—*Ibid, from Jahrb. für Prakt. Pharm.*

On the Purification of Mercury. By M. ULEX —In the distillation of mercury we are not only exposed to a very great loss, but the mercury is also not perfectly purified by it. This object is obtained, it is true, by digesting it with acids and perchloride of mercury; but it requires considerable time, as these agents are merely in contact with the surface of the mercury, and can only act upon all its particles by frequently repeated agitation. A solution of perchloride of iron alone possesses the property of dividing mercury to a very great extent. When, for instance, 1 lb. of mercury is treated with 3 drms. *Liquor ferri muriatici,* and the same quantity of water, and well shaken for half a minute, the entire mass is converted, with evolution of heat, into a dark gray mass. The perchloride of iron is reduced to the state of protochloride, while a portion of the mercury is converted into calomel, which latter prevents the globules of mercury running together. If the mercury contain any foreign metals in solution, they are more easily attacked by the chlorine than the mercury, and are either dissolved or precipitated in a pulverulent form. To see whether mercury is contaminated with foreign metals, for instance with tin or lead, merely shaking with air suffices. Chemically pure mercury does not deposit any black powder in this operation, nor does it coat the sides of the glass vessel with a pellicle of mercury. The latter occurs even with $\frac{1}{40000}$th lead; with $\frac{1}{3000}$th, the mercury deposits, even after shaking it for three minutes, a black powder; with $\frac{1}{1000}$th lead such a mass of the black powder is obtained, that the surface of

the mercury is no longer perceptible. With 4 per cent., and even with 2 per cent. of lead, a solid crystalline compound is obtained. In general the amount of lead does not exceed 1 per cent. In order to effect the purification of the mercury by protochloride of iron, 2 lbs. of mercury are triturated together with 2 oz. of *Liq. ferr. mur.* of 1.48 spec. grav., and as much water for ten minutes; then the solution of iron removed by decantation and washing with water, and the mercury deprived of its humidity by gentle heat. On trituration, the greater portion of the mercury runs together; by suitable treatment with muriatic acid, the calomel may be separated from the mercury in the gray powder, and decomposed with protochloride of tin and muriatic acid. If the amount of lead exceed 1 per cent., the operation should be repeated.—*Ibid, from Archiv. der Pharm.*

Preparation of Uric Acid from Guano. By DR. BENSCH.—The guano is well boiled for several hours with common potash, slaked lime and a sufficient quantity of water; the solution separated from the residue by a conical bag, evaporated until it forms a thick paste, and thrown whilst hot upon a linen cloth and pressed. The pressed mass is diffused through water, decomposed with common muriatic acid, and the coloured impure uric acid washed with water. The washed uric is dissolved in dilute solution of potash, and evaporated until the boiling fluid assumes the consistency of a thick paste, thrown upon a linen bag, and strongly pressed. The pressed urate of potash is boiled with 2 vols of water, constantly shaken, then rapidly pressed, and this proceeding repeated three or four times; this causes the mass to swell considerably; hence constant agitation is requisite top revent its being burnt. If a portion, when dissolved in potash and precipitated by muriatic acid, does not yield a perfectly colourless uric acid, the urate of potash is again completely dissolved in solution of potash, and treated as above.

Lastly, the perfectly white uric acid is dissolved in hot water, to which a little solution of potash is added; the clear hot solution, when poured into muriatic acid, yields colourless uric acid.

The mother-liquors are evaporated and treated as above, the purer solutions of potash being used to dissolve the potash salt in the more impure.

By this method I obtained $2\frac{1}{2}$ lbs. of pure uric acid from 100 lbs. of guano.—*Ibid, from der Pharm. und Chem.*

DRIMYS CHILENSIS.

R.P. SMITH, 144 CHESNUT ST PHILA